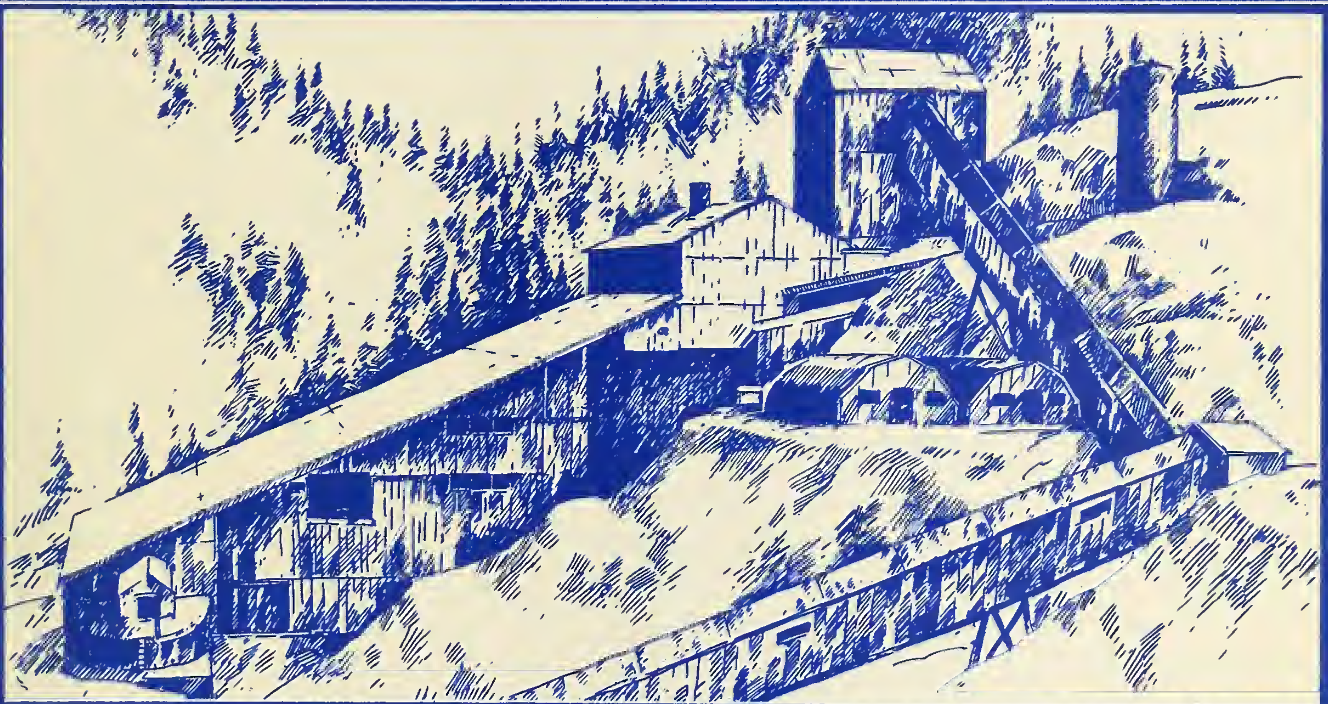
FINAL
ENVIRONMENTAL IMPACT STATEMENT

Blackbird Cobalt-Copper Project

Lemhi County, Idaho



FEBRUARY 1982

Salmon National Forest
Region 4
USDA Forest Service

RECORD OF DECISION

Final Environmental Impact Statement
Blackbird Cobalt-Copper Project
Lemhi County, Idaho
USDA Forest Service
Salmon National Forest

Based on the analysis and evaluation of the Final Environmental Impact Statement for Noranda Mining, Inc.'s Blackbird Cobalt-Copper Project, it is my decision to adopt Alternative 1 for the location, construction, operation and reclamation of all project related activities and facilities on National Forest System Lands.

There were four alternatives evaluated in detail in the Environmental Impact Statement including the No Action alternative which would not allow development of the project. Because the mine and many related facilities were in place, the three project alternatives differed from each other only in the location and type of tailings disposal and water supply facilities. Alternative 1 provides for locating the tailings disposal and water reservoir facilities in upper Blackbird Creek. The other alternatives evaluated included: (2) Location of a water reservoir in upper Blackbird Creek and the tailings disposal in lower Blackbird Creek, and (3) Location of the tailings disposal area in lower Blackbird Creek with water being pumped from Panther Creek to the minesite.

Alternative 1 is consistent with the Red Rock Peak Land Use Plan and Forest Service Policy which encourages the exploration and development of mineral resources on public lands provided reasonable protection of the surface resources is assured. The alternative selected provides adequate mitigation to avoid adverse resource effects and is considered to be the environmentally preferred alternative when physical, biological, economic and social factors are considered.

As with all activities conducted under the authority of the 1872 Mining Law, as amended, Noranda's Plan of Operation for National Forest System Lands will be the legal contract controlling mining activities. Alternative 1, as described in this Environmental Impact Statement, will become part of that plan and will guide subsequent mining activities while providing the necessary mitigation and monitoring requirements to protect the surface resources.

This decision is subject to administrative review in accordance with the provisions of 36 CFR 211.19.

The Decision will be implemented no sooner than

Richard T. Hauff

RICHARD T. HAUFF
Forest Supervisor
Salmon National Forest
Salmon, Idaho 83467

FINAL ENVIRONMENTAL IMPACT STATEMENT
BLACKBIRD COBALT-COPPER PROJECT
SALMON NATIONAL FOREST
LEMHI COUNTY, IDAHO

Lead Agency:	U.S.D.A. Forest Service
Cooperating Agencies:	U.S. Environmental Protection Agency Region X, 1200 Sixth Avenue Seattle, Washington, 98101
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Responsible Official:	Richard T. Hauff, Forest Supervisor Salmon National Forest
For Further Information Contact:	Tom Buchta Project Coordinator Cobalt Ranger District Cobalt, Idaho 83229 208-756-2240 or 3221

Prepared by: Environmental Research & Technology, Inc. (ERT), Fort Collins, Colorado for the Salmon National Forest

Copies of the source documents and references are available for review at the following locations:

U.S.D.A. Forest Service
Salmon National Forest
Salmon, Idaho 83467

Cobalt Ranger District
Cobalt, Idaho 83229

Salmon Public Library
Salmon, Idaho

Zone Information Officer
Palisades Ranger District
685 North Capital
Idaho Falls, Idaho 83401

Zone Information Officer
Boise National Forest
1075 Park Blvd.
Boise, Idaho 83706

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SUMMARY

FINAL ENVIRONMENTAL IMPACT STATEMENT
BLACKBIRD COBALT-COPPER PROJECT
LEMHI COUNTY, IDAHO

Description

This Final Environmental Impact Statement (FEIS) was prepared under the direction of the U.S.D.A. Forest Service, Salmon National Forest, in response to an application filed by Noranda Mining Inc. to reopen the Blackbird Mine in Lemhi County, Idaho. Noranda's activities in reopening the Blackbird Mine would occur on patented lands which Noranda acquired from previous mine owners, and public lands administered by the Forest Service. The federal action considered in this FEIS is the approval and/or modification of an Operating Plan for the proposed project by the Forest Supervisor of the Salmon National Forest.

The legal authority to require and modify operating plans to include reasonable environmental conditions for mining activity under the 1872 Mining Law as amended is contained in the 1897 Organic Act, as amended, and the regulations promulgated in 36 CFR 228 (formerly 36 CFR 252). This FEIS is issued by the Forest Service in compliance with the 1978 Council on Environmental Quality guidelines, which were developed to ensure that planning and decisions reflect environmental values and avoid potential conflict.

Noranda proposes to reopen the Blackbird Mine, rehabilitate the existing concentrator, and mine and process cobalt and copper ores. The project is scheduled to commence operation in 1984 with a milling rate of 1,200 tons per day for a period of at least 15 years. Mining will be underground using a cut and fill technique. A Proposed Plan of Operations for the Blackbird Project was submitted to the Forest Service in June 1980 and revised in January 1981.

The evaluation criteria developed for the analysis of the environmental impacts of the proposed Blackbird Project were derived from several sources including input from public and governmental sources. Criteria were developed to evaluate the relative effects of implementation of each project alternative. The significant criteria are those representing the most significant issues and concerns or those considered as unique constraints on the project; these criteria are listed in Chapter 3 of the FEIS.

The Blackbird Project components were designed using good engineering practices in accordance with relevant federal and state standards. Therefore, certain mitigation measures are inherent in the design of these components. The operation of the Blackbird Project in itself provides certain improvements over the conditions that

existed prior to Noranda's operation, particularly in terms of water quality in Blackbird Creek. Mitigation measures dealing with wildlife impacts, site reclamation, transportation and road maintenance, fire prevention, public safety, and employment and other socioeconomic effects have been developed.

Management constraints and guidelines were designed to minimize environmental disturbances during the construction, operation, and abandonment of the Blackbird Project. These requirements are mandated by federal or state laws and associated regulations or guidelines and cover most of the resource areas (i.e., water resources, vegetation, and recreation) discussed in the FEIS.

In order to avoid duplication of effort, standardize monitoring techniques, and share available data, the Forest Service will work with Noranda to develop programs for the Blackbird Project. Monitoring programs will deal primarily with groundwater quality and surface water quality and aquatic biology in Blackbird and Panther Creeks.

Alternatives Considered

Since the proposed project is an expansion of an existing operation and many of the key components of the development such as the mine and concentrator are fixed, the range of technically feasible and viable alternatives is more constrained than that of a totally new development. The two principal variables in Noranda's proposed expansion of the Blackbird operation are the location of the tailings disposal facility and the water supply source. Three viable options have been identified for the combination of each of these variables. These three alternatives are as follows:

1. Upper Blackbird Creek Tailings Disposal Facility and Water Supply Reservoir.

2. Lower Blackbird Creek Tailings Disposal Facility; Upper Blackbird Creek Water Supply Reservoir.

3. Lower Blackbird Creek Tailings Disposal Facility; Water Supply Pumped from Panther Creek.

Descriptions of these alternative development plans and the No Action Alternative are presented below.

No Action Alternative

The No Action Alternative would allow Noranda to continue operations at 300 tpd for the duration of their existing pilot operation; however, since Noranda has determined that operating at 300 tpd is not economically feasible and the existing tailings disposal facility would not support an extended operation, the No Action Alternative is considered a "no mine" alternative. Therefore, under this alternative Noranda would close the mine and terminate any further operation or development of the Blackbird Project. Reclamation of the site would be limited to that required by the Forest Service on public lands. It should be noted that the Forest Service does not

have the authority to deny Noranda's Operating Plan, but only to require reasonable modifications to it.

Alternative 1

Alternative 1 includes the tailings facility and water supply reservoir located in upper Blackbird Creek. This is the alternative proposed by Noranda. A utility corridor would be established connecting the concentrator, backfill plants, tailings disposal facility, and water supply reservoir. A new road would be established around the tailings and water supply reservoirs to provide access for construction and operation of these components. The existing Blackbird Creek Road would be upgraded to provide good all-season access to the major project components.

Alternative 2

Alternative 2 includes the tailings facility located in lower Blackbird Creek and the water supply reservoir in upper Blackbird Creek. This alternative would require rerouting approximately 2½ miles of Blackbird Creek Road to the south side of Blackbird Creek Valley along the new tailings impoundment. The remainder of the existing Blackbird Creek Road would be upgraded to provide good all-season access to the major project components. A utility corridor would be necessary from the upper backfill plant to the tailings impoundment and from the freshwater reservoir to the water storage tank.

Alternative 3

Alternative 3 includes the tailings facility located in lower Blackbird Creek and the water supply pumped from Panther Creek. Except for the water supply and distribution pipeline corridor, the corridor and access road requirements for this alternative are similar to that of Alternative 2. This alternative would require a water intake structure located in Panther Creek, and a water pipeline corridor from Panther Creek to the water storage tank at the new shaft facility in upper Meadow Creek. Two booster pump stations would also be required along this line to avoid excessive pump pressures. Powerlines would be strung to each pump station.

Summary of Environmental Effects

No Action Alternative

The No Action Alternative would not allow the production of significant amounts of cobalt concentrate and would thus contribute to the continued dependency on imported cobalt with its attendant balance of payments deficit and potential for termination of supplies. Water quality conditions would revert back to historical conditions (prior to Noranda's involvement) from the improved conditions currently provided by Noranda's pilot operation. This alternative would cause essentially no change to soils, vegetation, wildlife, or aquatic life.

Economically, the alternative would have numerous negative effects. If not allowed to expand, Noranda would essentially lose the significant investment it has made in exploration and the pilot operation. Approximately 100 people would lose their jobs if the No Action Alternative were implemented. Additionally the county and state would not accrue any of the tax benefits that would be derived from any of the action alternatives.

Alternative 1

Alternative 1 would yield minor water quality improvements to Blackbird Creek during operations with negligible improvements in Panther Creek. At abandonment, the alternative would also yield better water quality than conditions prior to Noranda's presence. Significant benefits to surface hydrology would occur at abandonment with this alternative because the water reservoir would act to attenuate flood flows which could adversely affect the tailings dam. The quality of groundwater from the mine area would be improved during operations by collecting it and treating it, and at abandonment by sealing the mine and reducing the oxidation of sulfide rocks and the subsequent generation of acid mine drainage. This would also be the case for Alternatives 2 and 3. Alternative 1 would have significant negative effects on wildlife habitat in the upper Blackbird Creek drainage, even though wildlife using this area are not numerous.

Long-term adverse social and economic effects with this alternative would be minimized or balanced by several economic benefits, although to no greater or lesser degree than Alternatives 2 and 3. There would be minor short-term dislocations and disruptions in social services and infrastructure demands under all three alternatives. The alternative is considered the most cost-effective by Noranda. Alternatives 1, 2 and 3 would not have any effects on the River of No Return Wilderness or the section of the Salmon River designated as a Wild and Scenic River. The transportation and handling of hazardous materials would be a significant hazard for the implementation of any of the action alternatives. This would be solely a

function of increased trips and volumes of materials transported in comparison to past conditions.

Alternative 2

Alternative 2 would also provide benefits to water quality during operations and at abandonment. Minor benefits to surface hydrology at abandonment would occur because the water reservoir would attenuate flood flows, but the benefits at the lower tailings dam site would be less than in Alternative 1 because of the larger drainage area. Only minor benefits to long-term restoration and stability were identified for this alternative, because restoration of areas in lower Blackbird Creek was considered more difficult than in upper Blackbird Creek and because the lower tailings dam would experience greater flood volumes over the long term.

The alternative would have only minor effects on wildlife habitat because of the lower quality of the habitat in lower Blackbird Creek compared with upper Blackbird Creek. Alternative 2 was considered less technically feasible than Alternative 1 because of the large diversion tunnels and increased lengths of pipeline necessary for the alternative. Noranda does not consider this alternative to be cost-effective. It would have similar social and economic effects as the other alternatives.

Alternative 3

Alternative 3 would have minor benefits to water quality only during operations because pumping water from Panther Creek would reduce dilution flows in Panther Creek and partially cancel some of the benefits of the water treatment plant operation at the mine. The end result would be somewhat lower water quality in Panther Creek in comparison to Alternatives 1 and 2, but still improved conditions over the past. At abandonment, Alternative 3 would have no effect on surface hydrology in contrast to the flood attenuation benefits of the water supply reservoir in Alternatives 1 and 2.

Noranda considers Alternative 3 less technically feasible to construct and operate than Alternative 2 primarily because of the need for another diversion dam, additional pipelines and powerlines to the pumping station and along the entire length of Blackbird Creek, and the major diversion of streams. Other effects from Alternative 3 would be similar to those discussed under Alternative 2.

Identification of Forest Service Preferred Alternative

It is the policy of the Forest Service to indicate the agency's preferred alternative in the Final Environmental Impact Statement. This preferred alternative represents what the Forest Service resource specialists and the Interdisciplinary Team

have recommended to the Forest Supervisor as the best alternative based upon the analysis of environmental effects utilizing the evaluation criteria. The Forest Supervisor has selected the preferred alternative following receipt of public comments on the Draft EIS.

During the evaluation process it was determined that all three action alternatives generally met the constraints of the evaluation criteria. A ranking system was then utilized to weigh the probable effects of the alternatives and to derive the apparent "best" alternative. The concensus of the Forest Service specialists and the Interdisciplinary Team was to recommend Alternative 1 to the Forest Supervisor as the preferred alternative to be presented in the FEIS.

Date of Transmission to EPA and the Public

Draft September 11, 1981

Final

1.0 INTRODUCTION

1.1. The Proposed Federal Action

This Final Environmental Impact Statement (EIS) was prepared under the direction of the U.S.D.A. Forest Service, Salmon National Forest, in response to an application filed by Noranda Mining Inc. to reopen the Blackbird Mine in Lemhi County, Idaho. Noranda's activities in reopening the Blackbird Mine would occur on patented land which Noranda acquired from previous mine owners and public land administered by the Forest Service. The federal action considered in this EIS is the approval and/or modification of an Operating Plan for the proposed project by the Forest Supervisor of the Salmon National Forest.

The legal authority to require and modify operating plans to include reasonable environmental conditions for mining activity under the 1872 Mining Law as amended is contained in the 1897 Organic Act, as amended, and the regulations promulgated in 36 CFR 228 (formerly 36 CFR 252). This authority does not extend to disapproving a plan that proposes a "reasonable operation" to be conducted in an "environmentally sound manner". Use of National Forest resources located on unclaimed public land will require authorization via special use permit approval by the Forest Service.

The emphasis on "reasonable operation" and "reasonable environmental conditions" underscores the importance of a systematic and complete analysis of all significant direct and indirect environmental impacts associated with a mining proposal. The EIS will be the vehicle by which this analysis is accomplished and documented. This EIS is issued by the Forest Service in compliance with the 1978 Council on Environmental Quality guidelines. In order to ensure that planning and decisions reflect environmental values and to avoid potential conflicts, the new guidelines specifically include the following requirements:

- The EIS should be analytic and concise, instead of encyclopedic.
- Impacts should be presented in proportion to their significance.
- The EIS should include the full range of alternatives to be considered by the responsible agency line officer.

1.2 Project Background

Noranda Mining Inc., a wholly-owned subsidiary of Noranda Mines Limited, is proposing to reopen the Blackbird Mine, which has been closed since 1967, to rehabilitate the existing concentrator, and to mine and process cobalt and copper ores. The project is scheduled to commence operation in 1984 with an eventual milling rate of 1,200 tons per day for a period of at least 15 years. Mining will be underground using a cut and fill technique.

Mining activities have been conducted in the Blackbird Creek drainage since the 1890's with mining and milling for copper and cobalt reaching a peak from 1950 to 1967

when operations by Calera Mining Company and Machinery Center ceased. In late 1977, Noranda acquired the Blackbird Mine and 837 acres of private land by option and since then has conducted geological investigations, metallurgical test work, and environmental and socioeconomic studies to evaluate the feasibility of reopening the mine.

The results of the preliminary feasibility studies were presented in August 1979 in the "Conceptual Plan of Operation and Socioeconomic Statement". After review of the Conceptual Plan, the Forest Supervisor advised that an EIS would be required to support federal action on the project. Since then, continued investigations have provided Noranda with data to revise their operating plans. A Proposed Plan of Operations for the Blackbird Project was submitted in June 1980 and revised in January 1981.

On July 14, 1980, the Salmon National Forest and Noranda Mining Inc. entered into a Memorandum of Understanding (MOU) specifying the responsibilities for the preparation of the EIS. The Forest Service and Noranda subsequently selected Environmental Research & Technology, Inc. (ERT) to prepare the EIS. The Forest Service directed the consultant on all phases of the EIS and assumed the final responsibility for the scope and content of the EIS. Noranda assumed the financial responsibility for the preparation of the EIS. The names and qualifications of the Forest Service, Noranda, and ERT personnel who prepared this EIS are presented in Appendix A.

1.3 General Description of the Project Area

The proposed Blackbird Project is located in Lemhi County, Idaho approximately 13 miles south of the Salmon River and 21 miles west of the county seat of Salmon. The project location is shown in Figure 1-1. Noranda's privately owned land (patented claims) of approximately 830 acres plus public land to be used for the project are located primarily within the Blackbird Creek drainage. Noranda also controls about 110 acres of the Cobalt townsite and has staked nearly 3,200 claims in the area surrounding the Blackbird Mine.

The project is located within the Northern Rocky Mountain physiographic province in central Idaho. Streams have cut deep canyons through these mountains creating slopes that are very steep and rocky. The Salmon River Mountains are the predominant mountain range in the region. Elevations range from 3,000 feet at the Salmon River to peaks of 9,000 feet near the claim area. The project area is characterized by a wet season in winter (mostly snow) from November through March and a dry season in summer from July to September. Except for the valley floor and some north-facing slopes which are covered with spruce and fir, most of the basin is forested with Douglas fir and lodgepole pine. Timber resources are marginal because of poor site conditions (rocky, steep slopes) and extensive insect damage. The forest composition and age structure is very complex because of repeated fires, some as recent as 15 years ago.

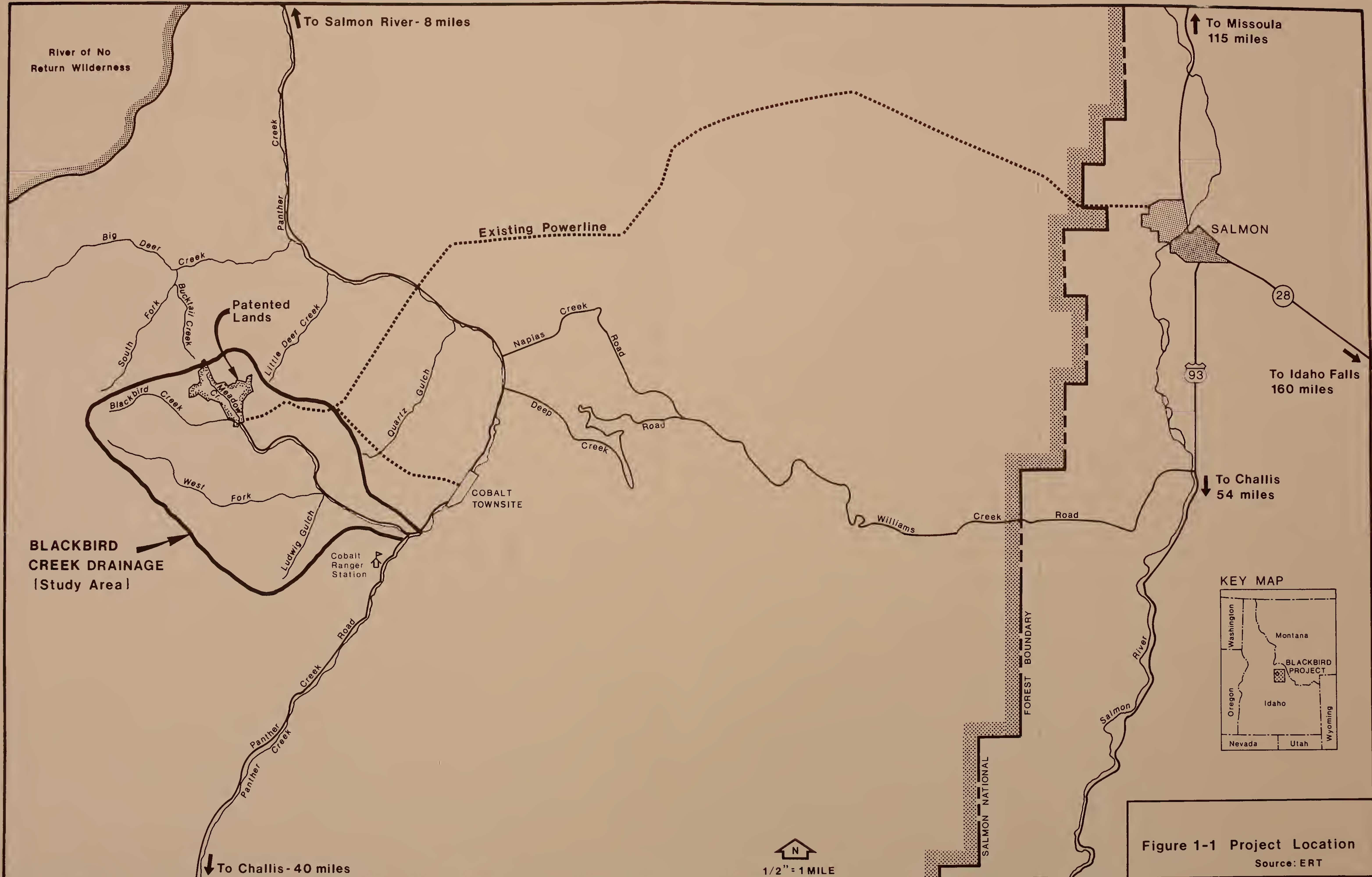

Figure 1-1 Project Location
Source: ERT

The project is located wholly within the Cobalt Ranger District of the Salmon National Forest. This region of the state has relatively diverse wildlife resources due to the wide variety of habitats available. Fisheries in the immediate area are quite poor due to historical degradation of water quality. Drainage from historical mine workings and waste disposal areas has affected lower Blackbird Creek and Big Deer Creek to the point where few fish inhabit these streams.

1.4 Major Issues, Concerns, and Opportunities

On August 29, 1980, the Forest Service filed a Notice of Intent to Prepare an Environmental Impact Statement for the Blackbird Project. The preparation of the EIS is governed by (1) the Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act, 40 CFR Parts 1500-1508, and (2) the Forest Service NEPA Process, Final Implementation Procedures, Forest Service Manual (FSM), Chapter 1950. Sections 1501.7 of the CEQ Regulations and FSM 1951.2 direct that a "scoping" process be used to identify the major issues, concerns, and opportunities that will be addressed in defining the scope of the EIS.

As the first step in the scoping process, a preliminary Scoping Document which identified environmental concerns was developed by the Salmon National Forest in consultation with federal, state, and local agencies and interested organizations and individuals. A Public Involvement Document was prepared by the Salmon National Forest and distributed to a mailing list of agencies, organizations, and individuals on August 27, 1980. The document solicited comments on the proposed project and asked for additional issues or concerns which the EIS should address. The distribution list was compiled by the Forest Service, Noranda, and ERT from all preliminary contacts made by the three groups and from a mailing list of respondents to the Forest Service's Notice of Intent to prepare the EIS.

Public meetings were held on September 30, and October 1, 1980 in Salmon and Idaho Falls, respectively. Both meetings were open to the public, and invitations were also sent to a mailing list of selected organizations and agencies. Additionally, written comments on the proposed project were received from federal and state agencies and many private individuals. Based on the results of the various meetings and the written comments, a Scoping Document was prepared and issued on December 8, 1980. The Scoping Document outlined the significant issues and concerns to be addressed in the EIS. It also identified and eliminated from detailed study issues which are not significant.

The major issues and concerns which have been raised by private and public individuals, agencies, and organizations, as well as the identification of positive opportunities which could arise from the proposed Blackbird Project, are outlined below.

Public Issues

- Are new chemical or heavy metal pollution hazards being created? If so, can they be effectively controlled?

- Will long-term stability and maintenance of the new tailings dam, stream diversions, water reservoir, slurry lines, water lines, roads, and other facilities be assured?

- Can heavy metal pollutants from waste piles and mine workings be contained or treated on a long-term basis?

- Can disturbed areas be successfully stabilized and/or revegetated?

- Will the proposed action adversely affect aquatic habitat? To what degree?

- Can present water quality be improved sufficiently to permit the restoration of salmon and steelhead in Panther Creek?

- Can resident fisheries be improved by the proposed operation? To what degree?

- Will the bighorn sheep be directly affected, and what will be the general effects on wildlife?

- The Blackbird Mine is within 5 miles of the River of No Return Wilderness. Will the proposed operation affect the wilderness resource?

- What will the effects be, if any, on water quality in the Salmon River?

- Does the Forest Service recognize the community's need for the economic benefits this project might bring to Lemhi County?

- Can the Lemhi County schools accommodate the increased number of students in the county?

- Can the local community meet the demand for increased housing and public and social services?

- Are the Forest Service and other agencies placing any regulatory or permit requirements on this project which will delay it or make it economically infeasible?

- Which roads should be used to access the site from major highways, and will they need improvement to provide safe and efficient transportation routes?

- Will the proposed operation require the transportation of hazardous chemicals and materials to the mine site?

- What are the effects of a patenting or land exchange effort by Noranda which would remove facilities from the requirements of a Forest Service operating plan?

Agency Management Concerns

- Will heavier traffic on back-country roads increase the vehicle safety hazard? If so, can the hazard be reduced to acceptable levels?

- Who will provide the funds for maintaining the transportation system?

- Which local roads should be constructed in the Blackbird Creek drainage? What will be their environmental impacts?

- Will the project have energy demands that will reduce the reliability of current energy supplies to Salmon and Lemhi County?

- How much new area (unaffected by past activity) will be affected?

- Will Forest Service research projects be affected by the proposed action?

- How will the proposal affect current range, wildlife, timber, and recreation programs?

- Can stream sedimentation produced by the soil disturbance during construction be minimized and limited to short duration?

- Will there be waste rock storage required? If so, is this material expected to contain sulfides or other pollutants? Can the waste rock piles be stabilized?

- Noranda will require an additional water source. What effect will this have on the amount and quality of surface and groundwater in the area?

- Can surface and groundwater resources be protected from contamination by the proposed action?

- Does construction of a large tailings dam on Blackbird Creek present a hazard such that a natural catastrophe could release toxic materials to the environment?

- What are the indirect effects on fisheries?

- What are the indirect effects on big game populations?

- Will the proposed action increase competition for outdoor resources in the surrounding area?

- Will air quality be affected and if so, can the effects be minimized?

- Will the risk of man-caused fires increase?

- Can the Cobalt townsite absorb a potential increase in population?

- Will future generations be protected, and to what degree, from the residual effects of this project?

- Can the local community meet the new demands for goods and human services?

- Will the project affect archeological resources? What is the potential for discoveries of major importance?

- Will historic resources be affected? What is the extent of historical values in the Blackbird Creek drainage?

<u>Opportunities Resulting from the Project</u>

- The proposed project may improve water quality in Blackbird Creek and Panther Creek below Blackbird Creek.

- Improvement of the transportation network may improve traffic safety and provide better access for emergency vehicles and recreationists.

- The project may expand the economic base of the City of Salmon and Lemhi County. The Blackbird Project will require approximately 470 employees at full production. It is expected that these employees will locate in Lemhi County with a major portion residing in the City of Salmon.

- A substantial increase in tax revenues may result during operation.

- The project may assist in reducing America's dependence on imported cobalt and improve our balance of payments. Since cobalt has been determined to be a strategic metal by the Federal Emergency Preparedness Agency, development of domestic sources has become very important.

1.5 Other Permits, Licenses, and Approvals

To bring this project into production, various permits and approvals must be obtained by Noranda in addition to approval of their Operating Plan by the Forest Service. Listed below are the major permits and approvals necessary for the Blackbird Project. Additional permits may be required during the life of the project.

- Special use permits for facilities and operations proposed outside the claim area on lands administered by the Forest Service.

- High hazard dam review by the Forest Service.

- Dam/impoundment plan approval from the Idaho Department of Water Resources (IDWR), Dam Safety Division.

- A pre-construction permit from the U.S. Environmental Protection Agency (EPA) for any source which may constitute significant airborne emissions.

- Preparation of a spill prevention, control, and countermeasures plan within six months of beginning operation. Required by U.S. Environmental Protection Agency.

- National Pollutant Discharge Elimination System (NPDES) permit from the EPA for discharges of treated mine and mill water into Blackbird Creek. IDHW-Bureau of Water Quality (BWQ) will assist EPA in determining effluent limitations.

- Approval of plans and specifications for new sewage treatment and wastewater collection, treatment, and disposal facilities by IDHW-BWQ; Lemhi County building permit for these facilities.

- A permit for new appropriation and use of surface and ground waters from IDWR.

- A Section 404 Permit for any dredge or fill activities in navigable waters, from the U.S. Army Corps of Engineers.

- Approval of plans and specifications for the construction of new potable water supply systems by IDHW-BWQ.

- Approval of plans, maps, specifications, and a report on operational procedures for solid waste land disposal sites by the IDHW, Bureau of Solid Waste.

- Consultation with the U.S. Fish and Wildlife Service and the Idaho Department of Fish and Game (IDFG) concerning threatened, endangered, and protected species as required by the Endangered Species Act.

- Approval of the cultural resources investigations by the Forest Service in accordance with Executive Order 11593, Protection and Enhancement of the Cultural Environment, and the National Historic Preservation Act of 1966, as amended.

- Permit for transportation, storage, and use of explosives from the U.S. Department of Treasury, U.S. Department of Labor, and Idaho State Mine Inspector.

- Approved building permits from Lemhi County.

- Stream channel alteration permit from IDWR for any diversions of Meadow, Blackbird, and Panther Creeks.

- Approval of a Mining and Reclamation Plan from the Idaho Department of Lands for a quarry for construction materials on private lands.

- Approval of road relocations and upgrading standards from the Forest Service engineer, and Lemhi and Custer County Highway Departments.

- Lemhi County building permit for dormitory occupation by single status employees in the Cobalt townsite.

2.0 AFFECTED ENVIRONMENT

2.1 Introduction

2.1.1 Historical Mining

This chapter describes the environmental components that would be affected by the proposed expansion of the Blackbird Project. The majority of the activities associated with this expansion would occur in the Blackbird Creek drainage. This drainage has been highly disturbed by previous mining activities that occurred in the project area from 1893 to the present. Evidence of these past activities includes existing buildings, waste rock piles, tailings impoundment, mine adits, numerous roads, and other areas of surface disturbance. The major existing facilities and principal areas of disturbance in the Blackbird Creek drainage are shown in Figure 2-1.

The Blackbird ore body has been mined by both underground and open-pit mining methods. The open-pit mining that occurred in the late 1950's has left a 10.3-acre unreclaimed pit and approximately 3.8 million tons of waste rock deposited on 45.8 acres in the headwaters of Blackbird and Bucktail Creeks. More than 80 years of underground mining has resulted in the development of at least 10 miles of underground workings. Numerous adits and ventilation shafts connect these underground workings with the surface in both the Blackbird and Bucktail Creek drainages. Approximately 1 million tons of waste rock have been removed from the underground workings and open pit, and deposited in the drainages. The estimated quantity of waste rock and the area disturbed by these disposal areas is given in Table 2-1.

Waste from the ore concentration process (tailings) has been disposed of throughout the Blackbird Creek drainage downstream from the existing concentrator. During the early period of operation, the tailings were deposited directly into Blackbird Creek for disposal. In 1950 a tailings dam was constructed on the West Fork of Blackbird Creek, and the resulting impoundment was used to dispose of the tailings produced from subsequent operations. This facility currently contains 2 million tons of tailings. West Fork of Blackbird Creek is diverted through a culvert that runs underneath the facility.

Numerous facilities still exist in the project area as a result of previous mining activities. Forest Service and county roads provide access to the mine site. A 69 kV transmission line from Salmon provides electrical service to the mine and the Cobalt townsite. A small fresh water supply pond for the mine is also located in upper Blackbird Creek. The existing areas of disturbance are shown in Figure 2-1.

The townsite of Cobalt is located approximately 6 road miles east of the mine site on private land. Cobalt presently contains limited community service facilities in addition to barracks and residences.

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Numerous facilities still exist in the project area as a result of previous mining activities. Forest Service and county roads provide access to the mine site. A 69 kV transmission line from Salmon provides electrical service to the mine and the Cobalt townsite. A small fresh water supply pond for the mine is also located in upper Blackbird Creek. The existing areas of disturbance are shown in Figure 2-1.

The townsite of Cobalt is located approximately 6 road miles east of the mine site on private land. Cobalt presently contains limited community service facilities in addition to barracks and residences.

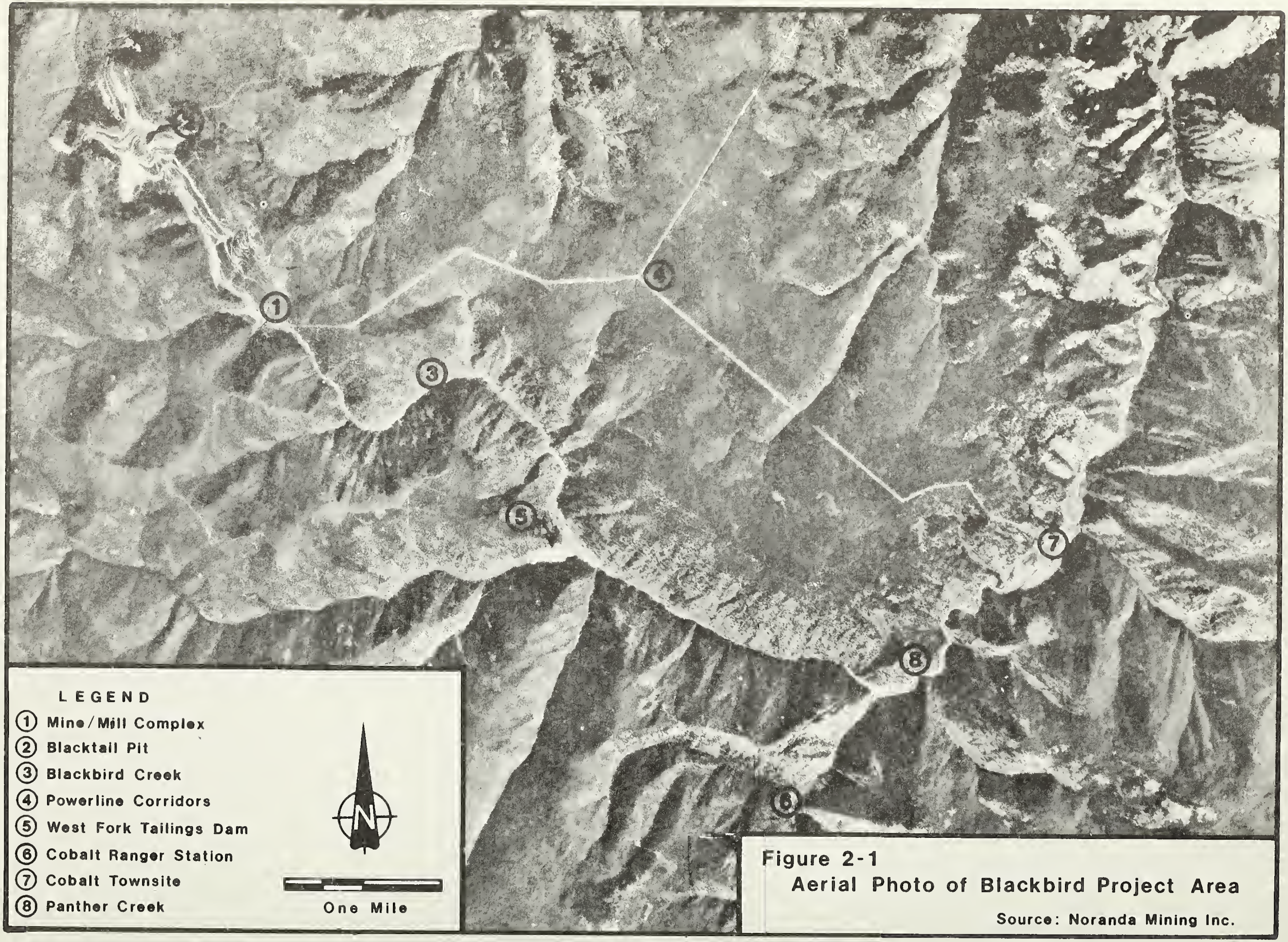


Figure 2-1
Aerial Photo of Blackbird Project Area

Source: Noranda Mining Inc.

TABLE 2-1

SURFACE WASTE ROCK DISPOSAL SITES

Existing Sites			
Waste Rock Disposal Site (Elevation)	Volume (Cu. ft.)	Tons	Disturbed Areas (Acres)
6850'	4,239,900	264,990	10.9
7100'	2,373,500	148,340	4.5
7400'	1,570,800	98,180	3.3
7117'	1,394,750	87,170	3.4
7265'	670,500	41,910	2.5
7200'	724,850	45,300	1.5
7300'	415,850	25,990	1.2
7410'	182,500	11,410	0.3
7250'	503,000	31,440	0.4
7080'	1,846,500	115,410	1.1
7270'	53,625	3,350	0.5
St. Joe	381,500	23,840	0.9
Sub Total	14,357,275	897,330	30.5
Open Pit Disposal Sites (41.7 acres in Blackbird and 34.6 acres in Bucktail Drainage)	33,825,350	2,114,090[1]	~45.8
TOTAL	48,182,625	3,011,420	76.3

[1]3.76 million tons reported by Calera 1959 Annual Report.

Source: Noranda Mining Inc.

As a result of water draining from old mine workings and flowing through old waste rock piles and tailings in the creek bed, the waters of Meadow Creek, Blackbird Creek, Big Deer Creek, and Panther Creek contain concentrations of heavy metals (copper, cobalt, and iron) and also low pH values, which exceed Idaho water quality standards. In 1975 the Forest Service contracted a rehabilitation project to stabilize 5,800 feet of Blackbird Creek downstream from the mill at the Blackbird Mine. This work included reconditioning a sediment reservoir with headgate, removing an existing pump station and a native log bridge, excavating the stream channel to a uniform cross section and grade, and placing a protective rock blanket along the channel banks (Forest Service 1976). However, much of the material through which Blackbird Creek flows in that reach of stream still consists of historic tailings.

2.1.2 Pilot Operation

On September 8, 1980, the Cobalt Ranger District of the Salmon National Forest approved Noranda's Plan of Operations for a pilot project to reopen the Blackbird Mine (Forest Service 1980). This approval allowed Noranda to rehabilitate old facilities, construct certain new facilities, and mine cobalt ore at a rate of 300 tons per day (tpd). It also specified certain management requirements and constraints with which Noranda must comply.

Pilot facilities which are located on private land include the existing mine and adits, the existing tailings disposal area on the West Fork of Blackbird Creek, and the Cobalt townsite. In addition, sewage treatment plants at the mine site and Cobalt and a water treatment plant at the mine site have been constructed.

Facilities constructed on public land include a diversion culvert, an expansion of the mine yard, a sludge pond, a runoff collection basin, a microwave communication site, a small sewage treatment plant, and a water line.

In addition to the Forest Service regulations, Noranda is also conducting its pilot operation according to the requirements of a federal National Pollutant Discharge Elimination System (NPDES) permit and a Compliance Schedule Order with the Idaho Department of Health and Welfare (see Appendix B). The NPDES permit specifies effluent limitations, monitoring requirements, and a schedule for compliance. The Compliance Order covers the above topics and also includes a clean-up program for Blackbird Creek within Noranda's private (patented) lands and a nonpoint source pollution study of Blackbird Creek. The water treatment plant for the pilot operation was constructed to comply with certain of these requirements.

2.1.3 Existing Environment

As a result of the historic mining activities in the Blackbird Creek drainage, certain environmental parameters (particularly vegetation cover, water quality, and

fishing resources) have been severely degraded. These resources are expected to remain in poor condition due to the continued leaching of heavy metals and sulfides from waste rock piles and tailings in the stream bed. Activities being conducted by Noranda as part of the pilot operation, including cleaning debris from Meadow Creek, routing Meadow Creek around waste rock sites (at 7400' and 7080') via culverts, and treating mine drainage and dewatering flows before they are discharged to Blackbird Creek, should improve water quality in both Blackbird and Panther Creeks.

The Forest Service has documented preliminary indications of water quality improvements for both Blackbird and Panther Creeks as a result of the activities carried out under Noranda's pilot operation. Although the possibility of presenting these improved conditions as the existing situation was explored, it was rejected for use as the baseline condition against which the project alternatives would be evaluated for two reasons:

1) There is insufficient data to quantify the degree of improvement.

2) The improvements under the pilot operation are contingent upon approval of the reopening of the full-scale mine.

Qualitative statements describing these improvements will be made where they will shed light on the effects which can be expected under the project alternatives.

The following section describes the conditions present in the project area prior to Noranda's involvement with the property. These descriptions reflect the effects of historical mining activities and document the severe damage which has occurred to the vegetative, water, and fishery resources.

2.1.4 Technical Reports

In the summer of 1980, the Forest Service and its contractors began environmental studies on Noranda's unpatented claim block and on patented land that may be affected by the proposed action. An interdisciplinary team was formed with expertise in the fields of visual resources, cultural resources, water resources, biology, soils, geology, socioeconomics, air resources, and noise. This team built upon the existing environmental information base for the region and collected site-specific data to accurately describe the affected environment.

The results of the discipline literature surveys, field sampling and mapping, and data analyses were published in technical reports which are on file with the Salmon National Forest in Salmon, Idaho and the Forest Service's clearing houses in Boise and Idaho Falls. On the following pages, the significant features of the environment which might be affected by the Blackbird Project are briefly described. Detailed descriptions of each environmental discipline are included in the respective technical reports. The disciplines which are described in this chapter include:

- Surface Water
- Ground Water
- Water Quality
- Aquatic Biology
- Wildlife
- Vegetation
- Soils
- Geology and Mineral Resources
- Air Resources
- Visual Resources
- Noise
- Socioeconomics
- Cultural Resources

2.2 Surface Water

The proposed project is located in the Blackbird Creek drainage which has a drainage area of approximately 21 square miles and an elevation range from 5100' to 8800'. Steep, rocky slopes are common. Surface water from Blackbird Creek drains into Panther Creek and then northward into the Salmon River near Shoup, Idaho.

Precipitation in the area varies with topography. Mean annual precipitation for Cobalt, Idaho at altitude 5600' is 18.4 inches. Limited data indicate that annual precipitation near the mine at altitude 6800' is approximately 5.3 inches greater (23.7 inches). Most of the precipitation in the Blackbird area occurs as snow. Snow course data from two locations near Blackbird Creek indicate average expected snow accumulation of 50 inches in the upper parts of the drainage, with an average water content of 16 inches.

The U.S. Geological Survey maintained a gaging station on Panther Creek near its confluence with the Salmon River from 1944 to 1977. Discharge records for this station have been correlated with partial flow records for Blackbird Creek, in order to construct a reasonable period of record for Blackbird Creek. These extrapolated values indicate that flows at the mouth of Blackbird Creek range from 2.6 cfs to 65.7 cfs, and that annual water yield to Panther Creek ranges from 3,763 acre-feet to 14,492 acre-feet. Instantaneous flow measurements are very limited. Table 2-2 summarizes the available discharge data for the Blackbird Creek drainage. The data are too sparse for future streamflow predictions, but seasonal trends be can be identified.

Early spring runoff is variable depending on temperature fluctuations. Heavy snowmelt runoff occurs during late spring, tapering off through June. Peaks from snowmelt runoff can occur from mid May to mid June. June runoff is also supplemented by precipitation events. Intense summer thunderstorms may occur causing discharge peaks of short duration. Low streamflow periods occur during the summer, fall, and winter.

TABLE 2-2

FLOW RATES AT VARIOUS STREAM SITES
(cfs)

Location	Station Number	No. of years data	Dec-Feb Min	May-June Max	Annual Mean
Upper Blackbird Creek	1B(8)	1	0.7	----	0.28
Blackbird Cr. below mill	2B(6)	3	1.12	15.2	7.24
Blackbird Cr. mouth	5B	3	3.49	45.4	23.48
Panther Cr. above Blackbird	7B	3	41.3	303.0	187.51
Big Deer Cr. mouth	6P	2	7.07	96.3	53.0

Source: Baldwin et al. 1978

Flood studies in the Surface Hydrology Technical Report indicate that the Blackbird Creek drainage has a relatively high potential for floods as a result of poor soil-cover complexes. The possibility also exists for thunderstorm activity in late spring while snow cover yet remains, causing low infiltration and high runoff. Flood studies have been completed for the proposed road crossings, tailings dams, diversion structures, and other points of hydrologic interest in the study area. These storm runoff predictions may be found in the Surface Hydrology Technical Report. Table 2-3 presents the peak flows for the locations shown in Figure 2-2. Runoff volumes associated with these storm events are relatively small.

2.3 Groundwater

Groundwater flow systems in the project area occur both in fracture-controlled bedrock systems and in unconsolidated surficial deposits; hydrologic connections exist between both of these groundwater flow systems and the surface water in the area.

Bedrock groundwater systems flow through the metamorphic bedrock and are intercepted by mine workings. The major observed discharges from the bedrock flow systems are point sources of poor quality water at mine portals. It is probable, however, that undetected springs and seeps discharge bedrock groundwater to the surface and to surficial deposits.

The Blackbird Mine is considered to be a relatively "dry" mine. With nearly 10 miles of adits, raises, and winzes, flow from the workings is only 221 gpm at peak annual discharge (5-10-76), while average annual discharge is lower. Because of the lack of interconnected pore spaces within the rock, groundwater storage volumes are low. Groundwater flow in the mine is directly influenced by surface variations of precipitation, recharge, and temperature. Flow from the underground workings discharges into two drainage basins: Blackbird and Bucktail Creeks.

TABLE 2-3

DISCHARGE PEAKS FOR RUNOFF EVENTS IN BLACKBIRD CREEK DRAINAGE

Event			#1 Road Crossing		#2 Lower Tailings Dam		#3 Ludwig Gulch Diversion		#4 West Fork Diversion		#5 Blackbird Creek Div	
Return Period (YRS)	Duration (HRS)	Total Precip. (IN)	Peak Disch. (CFS)	Runoff Volume (AC-FT)	Peak Disch. (CFS)	Runoff Volume (AC-FT)	Peak Disch. (CFS)	Runoff Volume (AC-FT)	Peak Disch. (CFS)	Runoff Volume (AC-FT)	Peak Disch. (CFS)	Runoff Volume (AC-FT)
100	1	1.1	133	22	80	12	1	0	0	0	346	43
100	6	1.6	435	74	277	43	20	1	77	4	613	79
100	24	2.6	900	201	703	153	62	9	276	40	866	158
500	6	1.9	861	147	649	103	63	5	277	18	981	129
500	24	3.1	1,622	430	1,350	353	127	25	590	114	1,295	722
PMF[1]	1	6.0[2]	32,340	3,478	33,456	3,333	6,694	430	28,832	1,747	17,325	1,754

Event			#6 Upper Tailings Dam		#7 Meadow Creek Above 6,850		#8 Blackbird Creek Mouth		#9 Water Supply Reservoir	
Return Period (YRS)	Duration (HRS)	Total Precip. (IN)	Peak Disch. (CFS)	Runoff Volume (AC-FT)	Peak Disch. (CFS)	Runoff Volume (AC-FT)	Peak Disch. (CFS)	Runoff Volume (AC-FT)	Peak Disch. (CFS)	Runoff Volume (AC-FT)
100	1	1.1	2	0	500	18	144	26	2	0
100	6	1.6	30	2	433	28	402	72	27	2
100	24	2.6	95	14	285	43	890	208	78	11
500	6	1.9	95	7	607	40	805	145	81	6
500	24	3.1	197	39	375	66	1,632	445	158	30
PMF[1]	1	6.0[2]	9,769	635	5,724	332	32,117	3,601	8,321	513

[1]Probable Maximum Flood

[2]Point Precipitation Value

Source: ERT

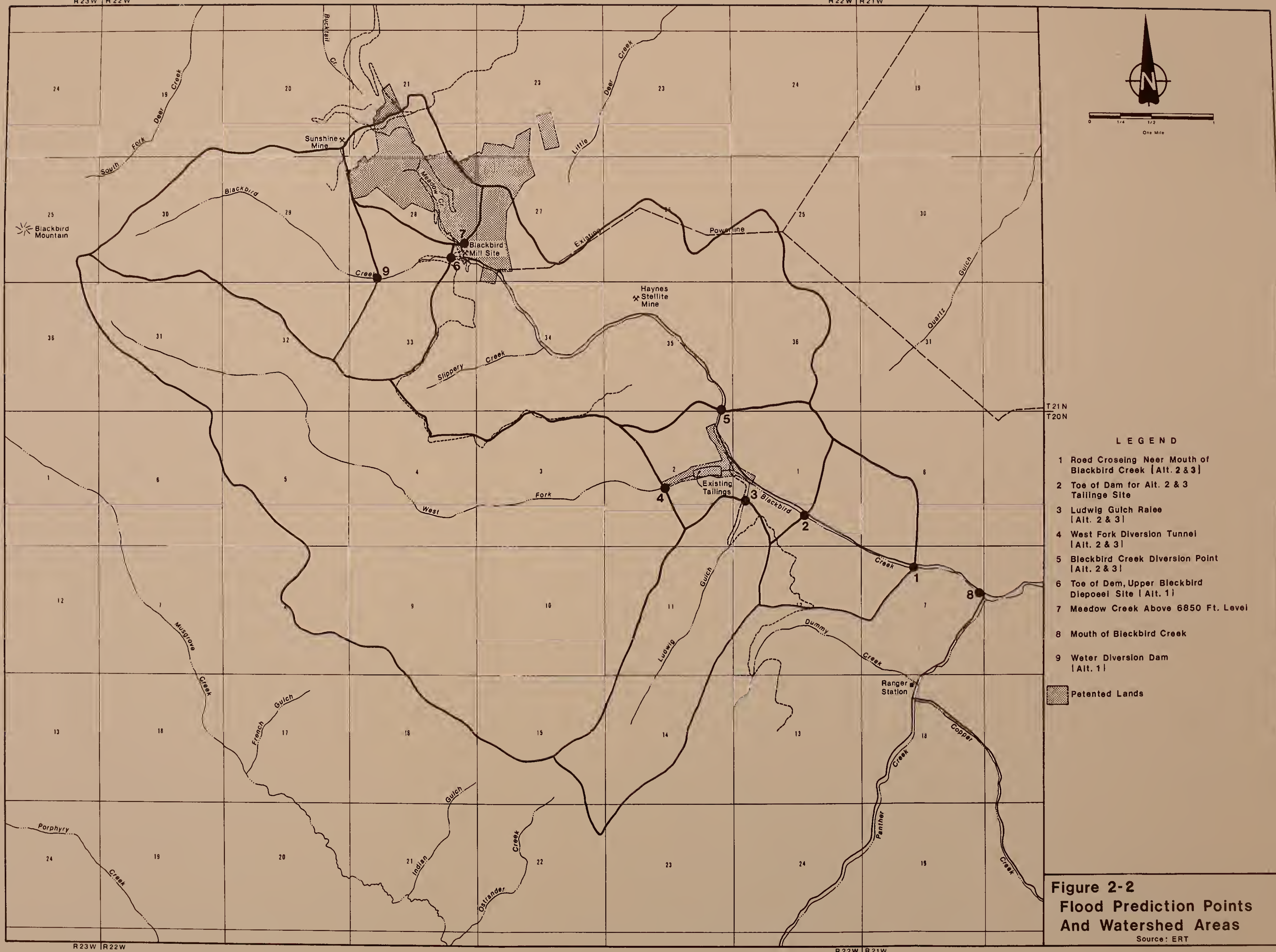


Figure 2-2
Flood Prediction Points And Watershed Areas
Source: ERT

Acid mine drainage from the Blackbird Mine affects the quality of the surface and groundwater in the project area. Acid mine drainage occurs in situations where pyrite and other metal sulfides become exposed to the atmosphere and are also in contact with surface or emerging groundwater. In the Blackbird Mine, groundwater flows through drifts, adits, down raises, and over ore bodies containing pyrite and other heavy metals. The mine is drained at the 6850' level where the water that has flowed over and percolated through the sulfide-rich rocks is discharged into surface waters. It is estimated (see Groundwater Technical Report) that Blackbird Creek discharges 101,000 pounds per year of dissolved copper, cobalt, and iron combined. Of that total, 48,950 pounds come from the Blackbird Mine, and 52,050 pounds come from springs, seeps, and non-point sources such as old tailings piles and spills.

The amount of recharge to the groundwater flow system has been increased by surface disturbance during exploration and previous mining activity (Baldwin et al. 1978). Another source of mine-induced recharge appears to be the Blacktail Pit. The pit has a drainage area of 25 acres, and it is believed that most of the precipitation in this area infiltrates through the bottom of the pit and discharges poor quality water into Bucktail Creek. This problem is presumed to be confined to the Bucktail Creek drainage, although a possible conduit to the Blackbird Creek drainage exists via the 7400' adit.

It is estimated that 10 percent of the flow from the 6850' portal occurs through increased recharge from surface exploration trenches and pits. Mine workings close to the surface can cause increased fracturing in overlying rocks, and flow increase from these mining-induced fractures is also estimated at 10 percent of the outflow at the 6850' portal (Baldwin et al. 1978). According to a survey of water rights (Noranda 1980), there are no significant developed groundwater resources in the Blackbird project area. Because of the ion permeability and storage properties of the metamorphic bedrock at depth, regional transport of groundwater beyond immediate surface drainage basins is assumed to be negligible.

Alluvial deposits consist primarily of silt, sand, and gravel deposited along stream channels. These deposits are generally very shallow in the project area, but are extensive near the confluence of Blackbird and West Fork Blackbird Creeks. Most of the alluvium is saturated throughout the year, and groundwater is in direct hydraulic connection with streams as underflow. Alluvial groundwater quality is similar to that of the streams flowing over and recharging these deposits (see Water Quality section).

Extensive deposits of coarse talus and colluvial soils occur on valley side slopes. Colluvial deposits, especially talus, may discharge water to visible springs during seasonal snow melt. Probable hydraulic connection exists between colluvium and alluvium, fractured bedrock, and shallow mine workings. Because of the extensive coverage of these deposits, few springs have been observed directly from bedrock flow systems.

Mine-related deposits consist of tailings and waste rock from mine development. These deposits are interconnected to surface and groundwater flows and contribute the majority of heavy metal loading to Meadow Creek. Recharge to mine-related deposits occurs from stream flow, precipitation, and mine drainage as shown in the groundwater flow chart. Mine drainage recharge to historic tailings in the Blackbird Channel is an especially important source of metal loading because acid waters discharging from the mine have the ability to dissolve metals contained in the waste.

2.4 Water Quality

During the 1950s and 1960s, aquatic life in Panther Creek was virtually eliminated as a result of mining in the Blackbird area by the Calera Mining Company and Machinery Center. Intensive surveys to characterize water quality problems in Panther Creek began around 1967. Because of differences in collecting these historic data and the manner in which water samples were treated by several agencies, data for this EIS are summarized on the basis of dissolved metal concentrations. It was determined that copper is the element of primary concern relative to aquatic life impacts in Panther Creek and the potential for some recovery of fisheries because it is the primary limiting factor for aquatic life. Table 2-4 presents water quality parameters in area streams.

From 1967 to 1980 metal concentrations in Blackbird Creek remained consistently high with pHs remaining low. This was the result of acid and metal laden discharges primarily associated with waste piles and mine portals on Meadow and Blackbird Creeks. Figure 2-3 demonstrates the spatial changes in copper concentration in Panther Creek above and below its confluence with Blackbird Creek. Below the confluence copper concentration increases dramatically due to the high metal loads in Blackbird Creek. Then a steady decline in copper concentration occurs downstream as a result of tributary dilution flows and the precipitation of copper in the higher pH water of Panther Creek. There is a moderate increase in copper concentrations below the confluence with Big Deer Creek, tributaries of which also receive discharges of metals from historic mine workings. The mean concentration of copper at the mouth of Big Deer Creek during the July-August season is 27 percent of that occurring at the mouth of Blackbird Creek. Consequently, the impact of Big Deer Creek on Panther Creek is less than that resulting from Blackbird Creek, but copper concentrations are still of sufficient magnitude to limit recovery of aquatic life. The pH relationships in Panther Creek are the opposite (reciprocal) of those observed for copper concentrations and are shown in Figure 2-3.

As a result of improvements made by Noranda in the mine area and the start-up of the mine water treatment plant (all part of pilot operations), reduced metal loading is expected in Blackbird Creek. Some of these improvements include diverting drainage

TABLE 2-4

IDAHO DOMESTIC WATER SUPPLY STANDARDS, AQUATIC LIFE CRITERIA, AND ANNUAL AVERAGE CONCENTRATIONS (mg/l) REPORTED AT SELECTED SITES ON PANTHER AND BLACKBIRD CREEKS[1]

Parameter	Idaho Water Supply Standards[2,3]	Federal Aquatic Life Criteria[4]	Upper Blackbird Creek	Blackbird Creek below Mill	Blackbird Creek Mouth	Panther Creek above Blackbird	Panther Creek below Blackbird	Panther Creek below Big Deer	Big Deer Creek Mouth
Arsenic trivalent	.050	.040[5] .440[6]	.003	.004	.004	.001	.001	-	.009
Cadmium	.010	.00001[7]; .0015[6]	<.0001	<.0003	<.0007	<.0008	<.0008	<.0001	<.0005
Chromium hexavalent	.050	.00029; .021[6]	-	<.005	<.005	<.006	<.006	-	.003
Cobalt	-	(.5 to 1.0)[8]	.068	3.79	1.25	.009	.277	.066	.388
Copper	-	.0056[7]; .012[6]	.017	3.91	.834	.007	.109	.070	.295
Iron	-	1.00[9]	.407	25.4	4.44	.276	.952	1.105	.451
Lead	.050	.00075[7]; .074[6]	<.001	.005	.001	<.006	<.006	<.001	<.011
Manganese	-	1.00[10]	.227	1.38	.579	.008	.073	.042	.009
Mercury	.002	5.7×10^{-7}[5] 1.7×10^{-6}[6]	-	.004	<.002	<.002	<.002	-	-
Nickel	-	.032[7]; 1.100[6]	-	-	-	<.010	.028	-	<.010
Silver	.050	.00012[5]; .0012[6]	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.001
Zinc	-	.047[7]; .180[6]	<.010	.054	.043	.004	.008	<.010	.015
Nitrate	10.0	-	1.04	2.50	1.90	-	1.14	-	-
pH S.U.	-	6.5-9.0	5.56	3.44	4.77	6.51	6.27	6.60	6.48
Temperature °C	-	-	-	9.0	9.2	7.2	7.5	8.2	7.3
Hardness	-	-	50	137.5	60.0	30.5	33.8	44	44

[1]Platts 1967.

[2]Idaho Water Supply standard are taken from the Federal Primary Drinking Water Standards. (EPA. National Interim Primary Drinking Water Regulations. 40 Code of Federal Regulations, Part 141.)

[3]Idaho Water Quality Standards and Wastewater Treatment Requirements (Idaho Department of Health and Welfare, Division of Environment, Title 1, Chapter 2; Effective June 28, 1973, Amended January 30, March 11, March 20, March 24, March 25, and April 1, 1980).

[4]EPA 1980. Part V. Water Quality Criteria Documents; Availability, Federal Register. Volume 45, No. 231. Friday November 28, 1980. pp. 79217.

[5]Reported effect level.

[6]Not to exceed, based on a hardness of 50 mg/liter.

[7]24 hr Average, based on a hardness of 50 mg/liter.

[8]McKee, J. E. and H. W. Wolf 1963. Water Quality Criteria (2nd Ed.) California Water Quality Control Bd. Publication No. 3-A. Limited data suggest criterion between .100 to .500 mg/I for cobalt.

[9]EPA (Red Book) 1976) Quality criteria for water. U.S. Environmental Protection Agency. U.S.G.P.O. 0-222-904 Washington, D.C.

[10]Division of Wildlife, Fort Collins, Colorado.

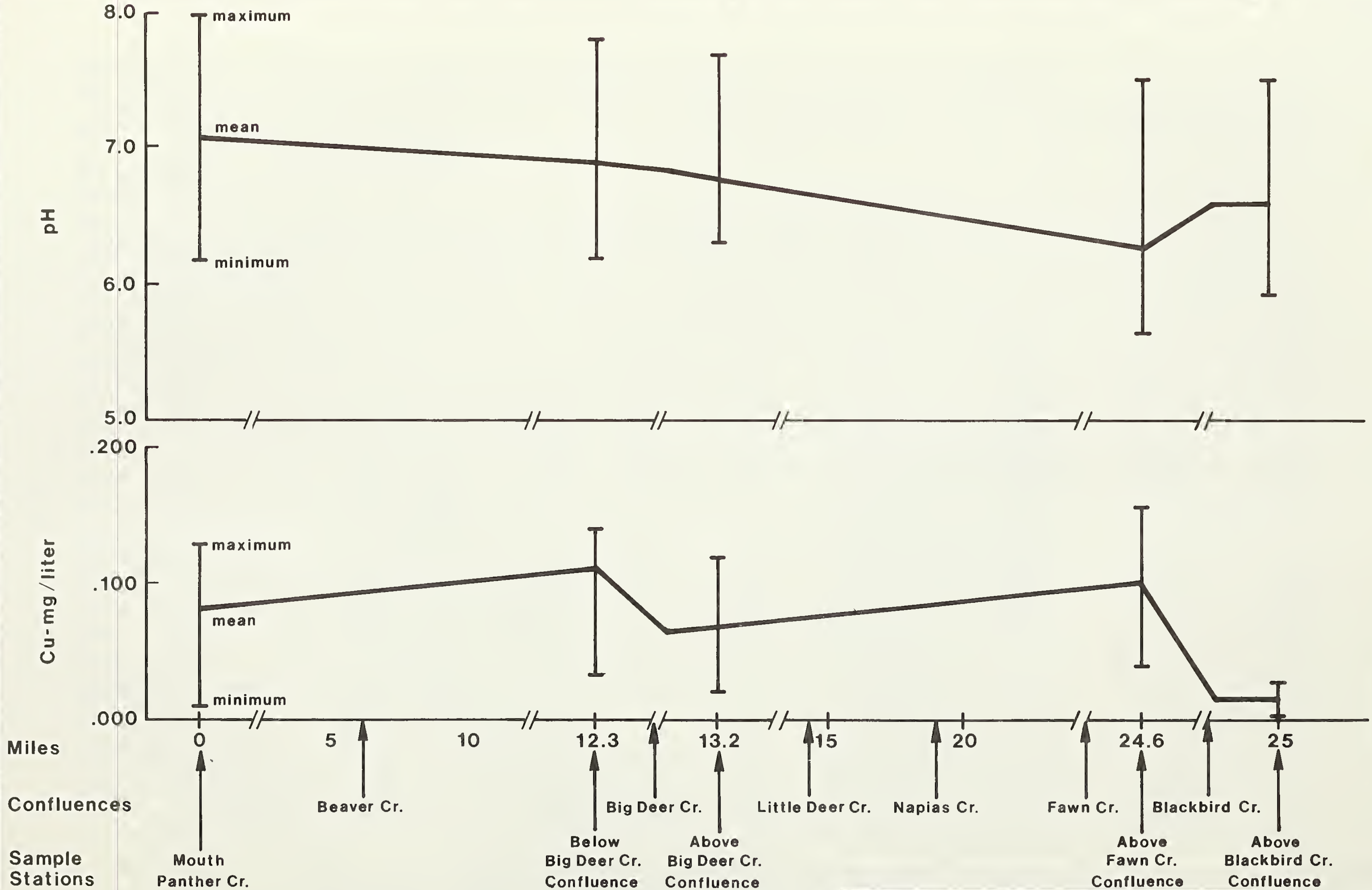


Figure 2-3 Spatial Change in pH & Copper Concentration in Panther Creek

Source: ERT

from the 7400' and 7100' portals to the 6850' portal for treatment, and installation of a culvert to separate the flow of Meadow Creek from the 7100' waste pile. Estimated reductions in copper loading are calculated to be between 25 and 50 percent. A more precise estimate is not possible at this time because of limited flow and copper loading data at various important sampling locations. Water quality monitoring subsequent to these improvements will be required to adequately define the improvement in water quality.

2.5 Aquatic Biology

Regional

The Blackbird Project is situated in the Salmon River drainage, which represents one of the larger rivers in the Columbia River system. Historically, the fishery of the Salmon River has represented an important part of the Idaho economy. Recreationally important species include chinook salmon (*Oncorhynchus tschawytscha*) and steelhead trout (sea-run rainbow) (*Salmo gairdneri*) which migrate from the Pacific Ocean and utilize the Salmon River drainage for spawning.

According to studies conducted on the South Fork of the Salmon River and at Bonneville Dam, the number of returning adult chinook salmon and steelhead trout entering the Salmon River drainage has steadily declined during the past 23 years. As a result of these declines, chinook salmon in the Salmon River drainage are approaching the status of a "threatened species" (Platts and Partridge 1978). During 1938-1963, the steelhead run averaged 259,000 fish, but decreased to 180,000 fish during 1964-1970. To partially compensate for these losses, the Idaho Department of Fish and Game initiated a stocking program in 1974 for both species (Horner and Bjornn 1980).

The Fish and Wildlife Service has determined, through informal consultation, that no threatened or endangered fish species, or any species proposed for such listing, occur in the project area. Therefore, no such species are expected to be affected by the Blackbird Project.

A combination of factors have contributed to salmon and steelhead declines. Much of the reduction in numbers is attributed to stress on migrating fish as they attempt to pass downstream hydroelectric dams and impoundments on the Snake and Columbia Rivers (Platts and Megahan 1975). To date, 22 dams on the main-stem Columbia and Snake Rivers have reduced the natural spawning habitat available to Columbia Basin salmon and steelhead runs by one-half (Chaney and Perry 1976). Mortalities of adult spring chinook salmon average approximately 15 percent for each mainstem dam (Chaney and Perry 1976).

Other important gamefish in the Salmon River drainage include rainbow trout (*Salmo gairdneri*), brook trout (*Salvelinus fontinalis*), Dolly varden (*Salvelinus*

malma), cutthroat trout (Salmo clarki), and mountain whitefish (Prosopium williamsoni). Of these gamefish, rainbow trout usually dominated in numbers. Other fish species are common in the Salmon River drainage, although much less is known about their densities and distributions. The Idaho Department of Fish and Game has strictly managed fishing during recent years. Salmon fishing has been closed in Idaho since 1977. Steelhead fishing has been closed on the Middle Fork of the Salmon River since 1974 because of the fish loss at the dams. The steelhead fishing season in the mainstem of the Salmon River currently runs from October 1 to March 31 of the next year (Reingold 1981).

Project Area

Mining of copper and cobalt deposits began in the Blackbird Mining District in the late 1800's. The chinook salmon run began to decline about 1940 and dropped sharply following the development of a mine on Blackbird Creek in 1949. Extensive fish kills occurred in Panther Creek during March, April, and July of 1954. Among the dead fish were 200 adult chinook salmon, steelhead, resident trout, and mountain whitefish (Corley 1967). Runoff and seepage from an open-pit mine and two portals which drain into Bucktail Creek, a tributary of Big Deer Creek, also contributed to the decline of the salmon run after 1956. Panther Creek was closed to salmon fishing in 1957 to preserve the remaining run (Welsh et al. 1965). From 1954 to 1962 an average of 51 salmon redds per year were observed by the Idaho Fish and Game Department in Panther Creek. Redd counts were discontinued after 1967 and no redds were observed during periodic field checks from 1968 to 1977 (Platts et al. 1979).

Aquatic biota in the mainstem of Blackbird Creek are essentially nonexistent at this time because of previous mining activities, but are in other streams in the project area. Table 2-5 presents representative data on aquatic populations in area streams. Significant portions of the watershed have been disturbed as a result of past indiscriminate waste rock and tailings disposal, road building, site grading, and mine discharge practices. Factors which presently limit the aquatic biota potential of Panther Creek include (in rank order): poor chemical water quality resulting chiefly from the Blackbird and Big Deer Creek drainages; reductions in spawning gravel amount and quality because of sedimentation from past mining and road building activities and present livestock grazing; and creation of major barriers to anadromous fish migration on the Salmon, Snake, and Columbia Rivers (see the Water Quality Technical Report).

TABLE 2-5

SUMMARY OF AQUATIC BIOTA IN BLACKBIRD PROJECT AREA

	Benthic Macroinvertebrates		
	Surber Samples (Total Taxa)	Artificial Substrate Samples (Total Taxa)	Fishes (Total Numbers/ Species)
Panther Creek above Blackbird Creek	38	26	27/4
Blackbird Creek	2	2	0
Panther Creek below Blackbird Creek	17	8	0
Big Deer Creek	1	3	0
Panther Creek below Big Deer Creek	18	21	18/6
Total	42	32	45/7

Source: Noranda Research Center July 1980.

2.6 Wildlife

Lemhi County, Idaho, is primarily a mountainous area with wide valleys along some of the major rivers (e.g., Salmon and Lemhi Rivers). Habitats range from river valley pasturelands to high mountain peaks. Wildlife diversity is high in the region due this wide variety of habitats.

The Blackbird Creek drainage is primarily a high mountain coniferous forest area with talus slopes and a few meadows and aspen stands. Water is scarce in the drainage occurring mainly in upper Blackbird Creek and the West Fork of Blackbird Creek. Wildlife habitat in the drainage is generally poor in quality due to low plant diversity (Becker 1980).

Conifers provide nesting habitats for a few species of birds (e.g., woodpeckers, nuthatches, chickadees, jays) and for squirrels and martens. Although less than one percent of the drainage is occupied by riparian habitats (i.e., streams, wet meadows) it provides the best wildlife habitat. Many species of wildlife (e.g., amphibians, snakes, mice, birds) that would be rare or would not occur at all in other habitats are found in these areas. Deciduous woodlands support a greater diversity of mammal species than conifer forests, but hardwood habitats are restricted to upper Blackbird Creek and the West Fork of Blackbird Creek with lesser amounts in Ludwig Gulch and Slippery Creek. Aspen are the dominant hardwood species in the drainage, although they are quite rare and are restricted to upper drainage meadows.

Large mammals are uncommon in the drainage because of habitat restrictions. The hardwood habitats are most used by elk, while mule deer may occur anywhere in the drainage. Deer would be most common in meadows, aspen stands, brushy areas, riparian

habitats, and on cool north-facing slopes. There is no elk or deer winter range in the drainage.

Mountain lion, mule deer, elk, and black bear are the big game species expected to occur in the project area, and mountain lion are probably uncommon. The Nuttall's or mountain cottontail is the only small game mammal expected in the drainage. Four species of furbearers are expected in the project area and none are expected to be common. Beaver may occur along upper Blackbird Creek and possibly the West Fork of Blackbird Creek. Marten may be found in dense lodgepole stands or other coniferous habitats. Bobcat and red fox may occur throughout the drainage.

Eight species of raptors (birds of prey) may occur in the drainage. Of these, American kestrel, red-tailed hawk, goshawk, and great horned owl are the common breeding species. The blue grouse is the most common gamebird in the drainage although spruce grouse may be common in certain habitats. Through informal consultation, the Fish and Wildlife Service indicated that no birds or mammals listed as threatened or endangered, or proposed for such listing, occur in the project area. Therefore, no such species are expected to be affected by the proposed development.

2.7 Vegetation

Four major land types constitute the Blackbird Creek drainage (USDA 1974). Valley land types compose the floodplain of principal tributaries to Blackbird Creek. Approximately 700 to 950 acres of these types are present in the drainage. Uplands in quartzite compose the ridges that divide the Blackbird Creek tributaries. This land type association occupies approximately 4,900 acres of the Blackbird Creek drainage. Mountain slope lands in quartzite occupy many of the moderately steep side slopes of the Blackbird Creek tributaries. An estimated 5,040 acres in the drainage consist of this type. Canyonlands consist of very steep rocky slopes above major drainages; an estimated 1,900 acres in the Blackbird Creek drainage consist of this type.

Vegetation of the Blackbird Creek drainage consists essentially of coniferous forests. At lower elevations (approximately 5,500 feet) these forests consist primarily of Douglas-fir. At higher elevations and on cool north-facing slopes, subalpine fir (*Abies lasiocarpa*), Engelmann spruce (*Picea engelmanni*), and lodgepole pine (*Pinus contorta*) increase in importance. Understory species composition varies with topography and soil development. Steep, south facing talus slopes are commonly occupied by curl-leaf mountain mahogany (*Cercocarpus ledifolius*) and nine-bark (*Physocarpus malvaceus*). Pine grass (*Calamagrostis rubescens*) is the dominant species under relatively dry Douglas-fir stands on all slope aspects. Grouse whortleberry (*Vaccinium scoparium*) is abundant under subalpine fir and lodgepole pine communities at higher elevations and on cool, north-facing slopes.

Natural fires and human disturbance are the most important influences on forest community composition in the Blackbird Project area. Lodgepole pine rapidly invades areas disturbed by fire and logging. This species often forms dense thickets of small, even aged trees ("dog hair" patches) with very limited understory development. At present, much of the upper Blackbird Creek drainage is dominated by lodgepole pine as a consequence of human disturbance over many years.

Forest productivity is generally low. Yield capabilities for communities in the Blackbird Creek drainage are classified as low to non-productive (Classes V-VI) (USDA 1974). Most stands accumulate from 20 to 50 cubic ft/acre/year. Basal area is generally small, ranging from less than 50 ft^2/acre on rocky, dry sites to 150-200 ft^2/acre on more moist sites with deep soils. Recent logging in the Blackbird Creek drainage has not been extensive. No livestock allotments presently exist in the project area.

Differences in the vegetation composition between the upper and lower portions of the drainage are quite significant. The lower Blackbird Creek Valley consists of sparse stands of Douglas-fir on south-facing talus slopes, and Douglas-fir and ninebark occupy north-facing slopes. The Blackbird Creek riparian zone has been largely eliminated by toxic tailings from previous mining. Most trees on this site are mature, and reproduction is sparse.

The upper Blackbird Creek area just west of the existing mine is dominated by a mixture of Douglas fir and lodgepole pine on the south-facing slopes, and subalpine fir, lodgepole pine, and Engelmann spruce on north-facing slopes. This site consists of a complex mixture of young and mature trees resulting from past fire and human disturbance. Most of the younger trees are lodgepole pine; mature trees are mostly Douglas-fir and subalpine fir. The riparian zone is dominated by larger (greater than 12 in. diameter) Engelmann spruce.

The Fish and Wildlife Service, through informal consultation, indentified four plant species that are candidates for consideration as threatened or endangered and may be present within the project area. These species are twinpod (*Physaria alpestris* var. *lyrata* and var. *pupurea*); Lemhi beardtongue (*Penstemon lemhiensis*); and Halimolobos (*Halimolobos perplexa* var. *lemhiensis*). Habitat for all four species includes dry rocky slopes in the ponderosa pine and lower Douglas fir zones. This talus habitat is present on south-facing slopes along Blackbird Creek from the Blackbird Creek-Panther Creek confluence to the existing mine. None of these four species were seen in field surveys conducted during August 1980 and June 1981. Much of the area in the vicinity of the mine has been extensively disturbed, and it is unlikely that these plants presently occur there. The talus areas in lower Blackbird Creek are the most likely to serve as potential rare plant habitat.

2.8 Soils

The soils of the project area are very gravelly silt loams, loams, and sandy loams. The north facing slopes along Blackbird Creek below the mine have a soil mantle depth of 2 to 5 feet. Rock fragments make up about 40 percent of the mantle. A zone of well-fractured parent material, ranging from 1 to 4 feet deep, underlies the soil mantle. On south facing slopes, the mantle may be up to 3 feet thick. The soil mantle here may contain 50 to 60 percent rock fragments and is underlain by 1 or 2 feet of fractured parent material. Slopes range up to 90 percent, but average approximately 50 percent. These areas may also have 30 percent talus and 20 percent rock outcrop.

Soils show more development above the mine and mill area on Blackbird Creek than below. Textures are very gravelly sandy loams, loams, and silt loams. The north-facing slopes and all exposures high in the drainage have soil mantles exceeding 5 feet in most areas. Rock fragments make up about 40 percent of the mantle and the soil surface is covered by a litter layer up to 3 inches thick. There are small areas of rock outcrop present. Slopes range from 30 to 60 percent. South-facing slopes in this area have a soil mantle of 2 to more than 5 feet deep. Rock fragments make up about 40 percent of the mantle and many areas have a litter layer. These areas may also have 30 percent talus and 20 percent rock outcrop. The soils above the mine are much more acidic than those below due to the acid nature of the parent material.

In general terms, all soils in the Blackbird Creek drainage have moderate permeability and moderate water holding capacities. Effective rooting depths range from 20 to 60 inches. Surface runoff is generally low to moderate, and erosion hazard ranges from low to moderate. In certain areas the slopes are so steep there is evidence of soil creep.

Recommended salvage depths and limitations for use as topdressing for the six major soil complexes identified in the Blackbird Creek drainage are discussed in the mapping unit descriptions in the Soils Technical Report. Generally, the soils found in the study area are marginal for topdressing material.

2.9 Geology and Mineral Resources

Geology

The geology of the mine area consists of slightly metamorphosed Precambrian quartzites. Structure in the area is complex. Along the approximate 2-mile strike length of the Blackbird Mine, each known ore body (zone) outcrops at the surface. Ore reserves are currently estimated below the 6500' elevation. Hydrous cobalt arsenate (Eyrithrite) and copper carbonates (malachite and azurite) manifest surface outcrops of ore. Ore bodies are irregular and vary from tabular to pod-like forms, from 6 to

70 feet thick. Mineralization is highly variable in space, and continuity along strike and dip is poor. The main cobalt ore mineral is cobaltite (CoAsS) and the main copper ore mineral is chalcopyrite ($CuFeS_2$). Iron sulfides are widespread particularly pyrite (FeS_2) and to a lesser extent pyrrhotite (FeS).

Mineral Resources

The ore bodies in the Blackbird Mine follow the N40°W strike direction of the 6850' level. In vertical plan, the eight main levels follow the ore zones down dip. The ore zones dip northeast at approximately 50 to 60 degrees. There are six main ore zones in the mine which trend from southeast to northwest. Most underground production has been from the center of the mine in the Chicago and Brown Bear zones. Open-pit mining has been conducted in the Blacktail zone at the north end of the ore body.

Cobalt is classified as a strategic metal which is used primarily in the production of high temperature alloys for jet engine turbine blades. It is also used in the production of electromagnets, metal cutting tools, and catalysts for the desulfurization of crude oil and liquification of coal. At the present time, about 80 percent of the world production of cobalt comes form Zaire, Zambia, Cuba, and the U.S.S.R. Thus, the United States must import 90 percent of its supply from uncertain suppliers. No cobalt has been mined in the U.S. since 1971.

Total measured and indicated reserves in the Blackbird area are 25,000 tons of cobalt and 75,000 tons of copper. This represents the largest ore reserves of cobalt in the United States. It should be noted that the vertical extent of the ore body below the 6500' level is unknown and therefore the reserve estimate could subsequently be increased.

Seismicity

The Blackbird site may be characterized as a region of low to moderate seismic activity. The "Earthquake Data File Listing" (NOAA 1980) for an area within a 162-mile radius of the site indicates that 159 earthquakes of magnitude 4.0 or greater and/or Modified Five earthquakes ranging from 4.0 to 4.9 have occurred within a 50-mile radius of the site; only two of these have occurred within 25 miles of the site.

The largest earthquake within the study region was the 1959, magnitude 7.1, Hebgen Lake event with an epicenter about 160 miles east of the site. Despite the distance, this major earthquake subjected Cobalt, a few miles from the site, to intensity V shaking. Intensity V effects were also reported at Cobalt from the July 26, 1976, magnitude 4.4 event which had an epicenter 6.2 miles from the site, the closest recorded event. These and other significant earthquakes which have occurred in the site region are listed in the Geology Technical Report.

The mass movement (land slide) potential within the Blackbird Creek drainage is limited to the relatively thin and coarse textured surficial deposits. The naturally occurring events identified in the drainage are relatively shallow rock or talus slides on steep slopes. Outside the drainage along the road corridors, the mass movement potential varies from low to high depending on geologic unit.

The clay borrow site for the water and/or tailings dam core is located opposite the mouth of Porphyry Creek on private land in the Panther Creek drainage; it occupies the toe of a complex landslide-flow event. The water-laden deposits possessed sufficient energy to liquify and flow down Sawmill Gulch and into the Panther Creek flood plain. Subsequently, water flowing in Sawmill Gulch eroded the landslide materials causing the separation of the upper and lower masses which exists today. The lower mass occupies approximately 50 acres.

Suitable conditions for avalanches include relatively heavy snowfall and steep open slopes. In general, avalanche potential in the project area is limited by the moderate snowfall the region receives; however, past records do indicate that during years of heavy snow accumulation, avalanches have affected Panther Creek and Blackbird Creek roads.

2.10 Air Resources

The Blackbird project is located in the mountainous region of the Salmon National Forest in central Idaho at an elevation of about 7000' above mean sea level. The closest community is Cobalt, located 6 miles east-southeast of the mine site on Panther Creek, nearly 2,000 feet lower in elevation than the mine. The climatology of the Blackbird Mine site has been assessed by analyzing data from on-site meteorological measurements at the mine and from the National Weather Service data collected at Cobalt and Salmon, Idaho.

During the summer season, the region experiences a cool and dry climate with occasional thunderstorms. The summer months are characterized by low relative humidity, less than 25 percent, and frequent sunshine. The mountainous terrain surrounding the site diminishes the strength of winter storms in the valley. Elevation, topography, vegetation, and available moisture all influence the microclimate of the mine site area.

The prevailing westerly winds which flow over the mine site area are considerably altered near the ground by the local topographic features. The sharp canyon and ridge type topography of the area causes local channeling of winds and daily upslope (from the south quadrant) and downslope (from the north quadrant) wind flow patterns. The valley formed around Blackbird Creek is oriented northwest-southeast and thus tends to

channel winds into these two directions. The combined effects of direct channeling caused by physical barriers to wind flow and the upslope and downslope flows created by diurnal heating and cooling along the sides and floor of the canyon create a complex wind flow pattern.

The data record indicates that relatively light winds, less than 11 mph, occur 64 percent of the time. This demonstrates the sheltering effect of the mountainous terrain from the upper level gradient winds. Strong winds, greater than 30 mph, were recorded only two percent of the time and were always from the north. These instances of high winds are probably associated with outbreaks of cold air during periods of frontal activity.

The annual average temperature at the mine site is 36^{o}F (based on nine years of data). Average maximum temperature ranges from 75^{o}F in July to 25^{o}F in January. The average minimum temperatures range from 5^{o}F in January to 42^{o}F in July. The most extreme temperatures observed at the site during the period 1951 to 1960 range from -26^{o}F to 91^{o}F (U.S. Forest Service 1980).

Precipitation data were available from the town of Cobalt and the mine site (National Weather Service 1980, U.S. Forest Service 1980). The mean annual precipitation, snow in water equivalent, for the Cobalt site is 22 inches. Well over half the annual precipitation occurs in the spring and winter months, and over 31 percent of the total occurs during spring alone. June has the highest mean precipitation and September the least precipitation. The average annual precipitation for the mine site, based on a 10-year record, is 20 inches. The most precipitation is observed in June, 2.8 inches, and the least in September, 0.7 inches. The average precipitation is typically more than a factor of two less in July than in June, indicating the transition from the wet to the dry season. The most precipitation observed in any one month at the mine site was 5.3 inches in May, and the highest annual total is 25 inches. The Cobalt data show that snow continuously covers the ground during the winter months. In January and February, typically 5-17 inches of snow remains on the ground throughout the month. It is expected that the snowfall at the mine site is at least as high as at the Cobalt station.

There are no existing air quality data for this region of Idaho; however because of the lack of any major sources of pollution in the area, it is assumed that the existing air quality is excellent. Background Total Suspended Particulate (TSP) loadings are expected to be in the 10-20 micrograms per cubic meter ($\mu g/m^3$) range, similar to those found in other isolated areas. The sources of TSP include vehicle traffic and wind generated dust. The project area and the River of No Return Wilderness, (5 miles to the west) are classified by EPA as Class II. There are no non-attainment areas in the Blackbird Creek area.

2.11 Visual Resources

The visual resources of the region surrounding the proposed Blackbird Project are characterized by steep mountain slopes and narrow valley floors. The scenic Salmon River Mountains and various manmade features exhibit a wide variety of forms, colors, and textures in this complex landscape. Vegetation adds variety to the region through contrasts of color in relation to the abundant rock forms. Water forms consist mainly of streams and reservoirs. The Salmon River is an important visual feature in the region.

The affected environment is defined as the area potentially influenced by the proposed Blackbird Project. It is located within the portion of the Blackbird Creek watershed which falls within view of the project alternatives. Dominant block forms are displayed by the existing structures in the canyon. Dominant grey colors originate within the rocky canyon side walls, the existing structures, and the disturbed land related to past operations. Textures range from extremely coarse in near view along the access road to fine in densely vegetated areas seen in distant views.

2.12 Noise

The affected environment can be described in terms of noise sensitive receptors, noise sources, terrain features, and existing noise levels. There are no wildlife or human land use areas sensitive to manmade noise within 5 miles of the proposed mine/mill complex. The terrain is very steep and isolates the proposed mine/mill site from outside areas. Existing natural noise levels are estimated to be in the range of 15 to 45 dBA.

Mill noise levels due to ore grinding and processing occur on a continuous basis 24 hours per day. However, except for workers in the immediate area, there are no identified receptor locations within 5 miles of the proposed operation. The nearest location where people would reside for any length of time is the Panther Creek Inn at the confluence of Blackbird and Panther Creeks. The Inn is over 5 miles from the mill site and would not experience any noise effects from the mill.

Private vehicles (cars and pickups) and large trucks (three and five axles) are the primary sources of noise as they traverse the Napias Creek, Deep Creek, and Morgan Creek roads. This traffic will affect residences in the Cobalt townsite and along Morgan Creek Road. Light vehicles (cars and pickups) traveling on gravel surfaced roads generally create noise levels of 80 dBA at 50 feet. Heavy trucks (greater than 10,000 pounds) traveling on gravel roads generally create noise levels of 90 dBA. Traffic noise is somewhat more offensive because of its intermittent nature than equally loud noises which are constant.

Receptors for this traffic noise consist of several residences in the Town of Cobalt Townsite, two residences along the Morgan Creek Road, and the Cobalt Ranger Station. Cobalt residences are typically more than 200 feet from the road with an intervening shrubbery barrier, so traffic noises are attenuated somewhat before they reach the residences. The residences along Morgan Creek Road are also behind shrubbery barriers and back from the road some distance, and should therefore not experience the full noise levels of traffic.

2.13 Socioeconomics

The primary socioeconomics study area includes Lemhi and Custer Counties; the communities of Salmon, Cobalt, and Challis; and School Districts #291, #292, and #181. Secondary emphasis was given to other communities and taxing jurisdictions within the two-county area to a level consistent with the lesser significance of anticipated project-related impacts.

Although a comparable level of baseline data collection and impact analysis was performed for all study area jurisdictions, emphasis is placed in the Environmental Impact Statement on Lemhi County, the City of Salmon, and School District #291. This approach reflects the anticipated distribution of project-related impacts; 97 percent of the population growth and related effects are projected to occur in Lemhi County versus only 3 percent in Custer County. More detailed information on Custer County, the City of Challis, and School District #181 is contained in the Socioeconomics Technical Report.

2.13.1 Population

The population of the study area has grown by more then 25 percent since 1970, reversing several previous decades of gradual decline (Table 2-6). Growth has occurred more rapidly in Lemhi County (34 percent) than in Custer County (14 percent). Although more detailed 1980 census data are not yet available, it is assumed that the composition of the population has remained similar to that indicated by earlier figures, with a continued shift toward the under-40 age groups; slightly more males than females in the population as a whole; and racial homogeneity (99 percent white in 1970).

TABLE 2-6

POPULATION TRENDS

County Community	1970	1975	1980	Percent Change 1970-1980
Lemhi County	5,566	7,032	7,460	+34.0
Forney Division[1]	70		119	+70.0
Leadore City	111		114	+2.7
Salmon Division			6,361	
Salmon City	2,910		3,303	+13.5
Custer County[2]	2,967	3,245	3,385	+14.1
Challis Division			1,746	
Challis City	784		758	-3.3
Mackay City	539		541	+0.4
Stanley City	47		99	+110.6
REGION	8,533		10,848	+27.1

[1]Includes Cobalt Townsite.

[2]These figures do not reflect changes due to the Thompson Creek Project in 1981.

Source: U.S. Census Bureau. 1980 Census of Population and Housing, Advance Reports, February 1981.

2.13.2 Employment and Economic Base

Employment and labor force characteristics are presented in Table 2-7. The economic base of the two counties is in a state of transition for several reasons. Agriculture while remaining stable in terms of land base, crop mix, and livestock numbers, has declined in importance relative to the employment and income growth in other sectors of the economy. Since 1970, growth in recreation (which influences real estate values and retirement numbers), civilian government employment, and recently the mining sector, has reversed the trend toward outmigration and population decreases in the 1950 to 1970 period. Mining, which provided the original impetus for settlement of the area in the 1870's and 1880's, has once again become important, with renewed exploration for gold, silver, cobalt, molybdenum, and other minerals. Construction of the Cyprus Mines Thompson Creek Molybdenum Project, 45 miles southwest of Challis, began in 1981, with a projected peak work force of 500 to 600 people. Most of the population associated with the Thompson Creek Project live in Challis. On the other hand, the Lemhi County lumber and wood products industry, which grew steadily between 1950 and 1970, began to expericnce reductions in output around 1975. This problem resulted in major production cutbacks and loss of jobs in Salmon and North Fork in 1979, contributing to a nearly 20 percent unemployment rate in Salmon in that year (Idaho Department of Employment 1980).

TABLE 2-7

EMPLOYMENT AND LABOR FORCE CHARACTERISTICS

	Lemhi County	Custer County	Region
Total Labor Force	3,151	1,643	4,794
Total Employed	2,842	1,571	4,413
Total Unemployed	309	72	381
Unemployment Rate	9.8	4.4	7.9

Source: Idaho Department of Employment 1980.

A comparison of employment and earnings by sector indicates that Lemhi County has a slightly more diversified economic base than Custer County. Agriculture (29 percent), trade (28 percent), and government (19 percent) are the leading employers in Lemhi County, as compared to agriculture (29 percent), government (28 percent), and trade (17 percent) in Custer County. Custer County is also more dependent on traditional agriculture-oriented activities in terms of contribution to the local economy than is Lemhi County, which has a broader manufacturing, construction, and trade base. Per capita income falls below state and national levels in both counties, although substantial gains have occurred relative to these norms since 1970.

2.13.3 Financial Resources

Taxing jurisdictions under consideration include both counties, the City of Salmon, the City of Challis, and School Districts #291, #292, and #181. Major revenue sources for county and community governments include property tax, sales and excise taxes, special fees and permits, and federal and state disbursements. Budgets ranged from a high of $2.15 million for Lemhi County in 1979 down to $374,000 for the Town of Challis. The largest expenditures typically are for general administration and operating costs; municipal enterprise activities such as water and sewer systems are generally self-supporting through specific mill levies and fees. School districts are financed primarily through the property tax, state funding, and bond issues for specific capital improvements. Bonding capacity for cities is limited to 2 percent of full market value, while school districts may bond up to 5 percent of market valuation. Bonds currently outstanding include: City of Salmon, $1.1 million; Town of Challis, $108,000; School District #291, $2.3 million for the new Salmon High School; and School District #181, $155,000.

The property values in the project area reflect the shift in 1979 from assessed valuation appraised historically as a percentage of total value (approximately

20 percent) to full market value. These figures also reflect the 12 to 14 percent Homeowner's Exemption allowed in 1980 and recently extended through 1981; total market value without the exemption would be higher. If the homeowners exemption is discontinued after 1981, these shifts in tax burden would be eliminated and total market value would increase by approximately 5 percent in Lemhi County and 3 percent in Custer County (based on comparison of 1980 tax base with and without the exemption).

Under the "1 % initiative" passed in 1978, most local budgets have been frozen for the last two years. Implementing legislation passed in 1981 (HB 389) limits budget increases to 5 percent annually in the existing property tax base, for a five-year period, by two-thirds popular vote. In growth areas where major industrial facilities are being developed, however, each taxing jurisdiction may either incorporate 50 percent of the increased market value associated with the new construction into the existing tax base and apply the previous year's mill levies to generate additional revenue, or remain within the 5 percent limit on total budget increases with a corresponding reduction in tax rates (mill levies). School districts may use the 50 percent option, the 5 percent budget increase limitation, or a 0.25 equalization levy, whichever would generate the most revenue.

2.13.4 Land Use

A large majority of the land in the study area is publicly owned. Over 92 percent of Lemhi County and 95 percent of Custer County are owned by federal, state, and local governments. Federal lands are controlled by the U.S. Forest Service and the Bureau of Land Management planning programs and procedures. Local governments have few land use regulations. Lemhi County has a subdivision ordinance but no zoning ordinance; a comprehensive plan is being prepared. Custer County does not have a comprehensive plan or development regulations. Both counties issue building permits.

Forests and range lands are the predominant land uses in the study area, comprising 54 percent and 39 percent respectively of the total land in the two counties. Cultivated agricultural land is the third largest use at slightly over 4 percent of the study area. Agricultural lands are used mostly for livestock and hay production, primarily in low lying valleys along the Salmon and Lemhi Rivers. Agriculture has been the traditional economic base of the study area since the early part of the century, and continues to be one of the key basic industries. Urban uses consume less than 0.1 percent of the land area of Lemhi and Custer Counties but they compete with agriculture for the flat lands in the valley bottoms. The resulting conversion of relatively rare agricultural land to urban uses is considered a serious land use problem in the study area at the present time (Oldham 1980, Johnson 1980), compounded by the location of subdivisions on unsuitable terrain.

2.13.5 Housing

Preliminary 1980 census data indicate a current total housing stock of 3,452 units in Lemhi County and 2,100 units in Custer County, for a study area total of 5,552 housing units. These figures illustrate increases of 53 percent for Lemhi County, from the 1970 figure, 59 percent for Custer County, and 55 percent for the entire study area. The Salmon housing stock was estimated at 1,430 units in 1980, up 32 percent from 1970.

Vacancy rates for rental units continue to be very low because the area's low rental fees do not provide an adequate return on investment so that few new developments are built. There are as many as 100 homes for sale in Lemhi County but few of these are converted to rentals. Trailer parks are near capacity in the area; several more have been proposed or are under construction. The overall housing situation in Lemhi County can be characterized as having few rentals, expanding mobile home opportunities, and numerous single-family homes that are vacant or for sale.

Cobalt currently has approximately 40 single-family detached and semi-detached housing units, most of which are in good to very good condition. Eighteen of the units are owned by Noranda; the remainder are privately-owned structures on leased ground. In addition, Noranda owns and maintains domitory type housing accommodations with capacity for approximately 196 individuals.

Challis currently has an estimated 395 housing units, up 37 percent from 1970. Housing prices have risen rapidly in recent years and currently range from approximately $35,000 to $95,000. Vacancy rates are near zero and there is very little, if any, rental housing in the community. There has been some tendency in recent years to build homes on small acreages north and south of the city.

2.13.6 Public Services

2.13.6.1 Health Care. Health care services in the study area are provided by hospitals, clinics, private professionals, and government agencies. Steele Memorial, located in Salmon, is a 36-bed hospital which has recently been renovated. It can handle a wide variety of primary and secondary treatment cases; only cases requiring very special care or treatment may be sent to Missoula, Montana; Idaho Falls, Pocatello, and Boise, Idaho; or Salt Lake City, Utah. Steele Memorial is currently operating at a 60% occupancy rate, which is adequate to meet existing needs. The North Custer Health Clinic, in Challis, has day care facilities for primary medical treatment, x-ray, minor emergency surgery, and emergency obstetrical care. Serious cases are transferred to the cities listed above, Sun Valley, or Salmon. The Challis facility is quite large and could handle more patients than it now treats. The number

of medical care professionals residing in Lemhi and Custer Counties is shown in Table 2-8. Lemhi County has a significantly larger staff than Custer County, which has a shortage of medical professionals.

TABLE 2-8

HEALTH CARE PROFILE

Type of Professional/Services	County	
	Lemhi	Custer
Physician[1]	5	1
Chiropractor[2]	2	0
Optometrist[3]	1	0
Psychologist[3]	0	0
Dentist[4]	4	1
Licensed Practical Nurse[5]	34	5
Registered Nurse[5]	18	4
Public Health Nurse[5]	4	3
Hospitals[6]	1	0
Hospital Beds[6]	36	0
Ambulances[1]	2	3
Health Clinics[2]	1	1
Mental Health Centers[1]	1	0

Data Sources:

[1]County Profiles Idaho. Idaho Division of Economic and Community Affairs 1980.

[2]Lemhi County Telephone Directory 1980.

[3]Initial Health Systems Plan 1978-1983. Idaho Health Systems Agency, Inc. 1979.

[4]Idaho Board of Dentistry 1980.

[5]Idaho Board of Nursing 1980.

[6]Richards 1980.

2.13.6.2 Social Services. Social services available in Lemhi County include mental health counseling, vocational rehabilitation, alcohol and drug counseling; financial aid programs such as aid to the blind, elderly, disabled, and families with dependent children, and food stamps. The state office that administers these programs is located in Salmon and it also provides services to Custer County residents through weekly visits to Challis. The current level of social services appears to be adequate for existing needs.

2.13.6.3 Law Enforcement. The three principal law enforcement agencies in the study area are the Custer and Lemhi County Sheriff's Departments and the Salmon City Police Department. The Lemhi County Sheriff's Department patrols all areas of the county except Salmon, while the Custer County department serves the entire county.

The Lemhi County Sheriff's Department consists of the sheriff, four patrol officers, and four patrol cars. The jail and dispatch facilities are located in Salmon and they are shared with the City of Salmon police. A decrease of 4 percent in total reported crimes was recorded between 1973 and 1978 in Lemhi County. There are no immediate plans for expanding the department's services.

Custer County law enforcement services, including the jail and dispatch facilities, are based at the county courthouse in Challis. The department currently employs the sheriff, three patrol officers, one administrative officer, and three dispatchers. It owns six patrol cars. Reported crimes in Custer County increased 193 percent between 1973 and 1978. Future plans call for doubling of jail facilities and the addition of new personnel at a rate of one officer per year.

The local judicial system consists of the Judicial District Court and Justice Courts, located in Salmon and Challis. There has been a substantial rise in the number of traffic cases and criminal felonies between 1979 and 1980 in Lemhi District Court. Total cases filed increased 36 percent in the one-year time period.

2.13.6.4 Fire Protection. Fire protection services on private land in Lemhi County are limited to cities/towns and to fire protection districts. The City of Salmon offers the best fire protection in the region. It has a 30-man volunteer department with an average response of 23 men per fire, a combined pumping capacity of 3,250 gpm, and a mobile water storage capacity of 1,750 gallons. The current service level for the city is considered very good.

The City of Challis has one pumper and an 18-man volunteer fire crew, headquartered at the county courthouse. Response times to fires are good and fire protection services are adequate for existing needs.

Rural areas of Lemhi County have very limited fire protection service, except for the towns of North Fork, Leadore, Gibbonville, and the Elk Bend Fire Protection District. Fires outside of these areas are fought by a 10-man crew with one pumper, located in Salmon. Long response times are a major problem in such locales. The Cobalt townsite currently has a fire tank connected to a hydrant system with fire hoses distributed around the townsite. Upgrading of this system is currently being investigated.

2.13.6.5 Utilities.

- Electrical service is provided to the Salmon and Cobalt areas by Idaho Power; to Challis by the Salmon River Electric Cooperative. Plans to upgrade the existing 69 kV line to 230 kV are in operation.

- Telephone service in Salmon is provided by the Lemhi Telephone Company; Custer County Telephone Cooperative serves Custer County including Challis, and parts of southwest Lemhi County. The capacity of these systems is being expanded by approximately 60 percent.

- Both Salmon and Challis have municipally owned domestic water supply systems from underground and surface sources. The Cobalt system is owned by Noranda. The Salmon system is currently operating at capacity while the Challis system is at 70 percent of capacity.

- Wastewater treatment in the study area is provided by municipal systems in larger communities. The Salmon area is served by an aerated lagoon system designed to accommodate 8,000, but it is currently operating at capacity; the Cobalt townsite uses a mechanical treatment plan which will accommodate 200-250 permanent residents.

- Solid waste disposal services in the study area are undergoing changes in compliance with RCRA. Lemhi County has 1 sanitary landfill in Salmon, 7 modified land fills and 7 additional dumping sites; Custer County has one sanitary landfill, 10 modified landfills (one in Challis), and 16 other dumping sites.

2.13.6.6 Schools. Three school districts provide educational services to study area residents, although only two districts may be significantly affected by the Blackbird Project. Lemhi School District #291 covers most of the county and the City of Salmon. Lemhi School District #292 encompasses the southeastern portion of the county and the towns of Leadore, Tendoy, and Bluedome. This district should not be significantly affected by the Blackbird Project. Custer School District #181 serves most of Custer County.

Enrollment, staff, and financial information about each district are shown in Table 2-9. The number of students in District #291 has remained fairly constant since 1973, except for the addition of a kindergarten grade in 1980. The 1980-81 enrollment is 1,501, and the district has 83 certified staff members, leading to a 18:1 student to teacher ratio. A new high school was recently completed in Salmon. The Pioneer Elementary School is overloaded but three other schools have a total unused capacity of about 145 students. At a minimum, four additional teachers are needed to relieve crowding (Cook 1980).

Custer School District #181 has a current enrollment of 466, and 100 to 150 additional students are expected in the spring 1980 semester. The district has 33 certified teachers leading to a student to teacher ratio of 14:1. Development of the Cyprus Mines Thompson Creek Project is expected to contribute an additional 469 students by 1983. Existing facilities are adequately serving current needs but they would not be sufficient to meet projected future demands. The district is planning to construct new elementary and high schools by 1983. Declining enrollment is the most serious concern for South Lemhi District #292, but it is not expected to receive a large number of new students from Blackbird Project worker families.

TABLE 2-9

SCHOOL DISTRICT CHARACTERISTICS, 1979-80 SCHOOL YEAR

Facilities and Staff	School District		
	Lemhi #291[2]	South Lemhi #292[3]	Custer #181[1]
Number of Schools			
Elementary	2	2[4]	4
Junior	1	0	2
Senior High	1	0	1
Total Enrollment[3]	1,349	132	466
Elementary (K-6)	697	NA[4]	269
Junior High (7 & 8)	224		196
Senior High	428		196
Certified Staff	82	14	33
Student/Teacher Ratios[4]	18/1	10/1	14/1
Expenditures/Student[3]	$3,723	$2,411	NA
Bonded Debt[3]	2,200,200	0	155,000
Assessed Valuation/ADC[3]	11,976	23,716	NA

NA - data not available

Sources: [1]VTN 1980

[2]Cook 1980

[3]Idaho Department of Education, 1980

[4]School District 292 has one school, grades 1-6 and another, grades 1-12

[5]Matson 1980

2.13.7 Recreation

Recreation resources in the Blackbird Project area include developed facilities, fish and wildlife resources, water resources, and undeveloped resources. Ten developed campgrounds are found in the mine vicinity which are popular areas for picnickers, hunters, and fisherman. Game and non-game fish and wildlife species attract great numbers of visitors to the region, including many non-residents. Big game hunting is very popular and a significant source of local revenue. The economic value of deer and elk hunting within Game Management Unit 28 was estimated at $1,166,400 in 1979 (Bodie 1980).

The nationally famous Salmon River flows through the study area and, along with portions of Panther Creek, provides habitat for steelhead trout and salmon. In 1977, the economic benefit of salmon and steelhead fishing within the east-central Idaho area including Lemhi and Custer Counties was estimated at $6,886,110 (Ball 1980). The Salmon River is also very popular with whitewater boaters. More than 8,000 people floated or jet-boated the river from Corn Creek to Riggins in 1980 (Wiley 1980).

The 2.2 million acre River of No Return Wilderness Area is located appoximately 5 miles from the Blackbird Mine and has a wide variety of wildlife, scenic, and recreational attributes. It is popular with hunters, backpackers, and fishermen. Access to a large portion of the eastern flank of the wilderness is via Panther and Porphyry Creek Roads.

2.13.8 Social Values

Sociocultural value systems within the study area have traditionally centered around an agrarian lifestyle with emphasis on community solidarity, individual independence and self-sufficiency, resistance against external controls, and strong ties to the land, family, and community. Ranching and farming are perceived as a way of life to be passed from generation to generation, not just a means of "making a living". In this context, imposition of external constraints, particularly by the federal government, which are perceived as threatening this lifestyle, is strongly resented. On the other hand, recent surveys of existing residents in Custer County indicate ambivalence toward large-scale private industrial development. Most people appear to have mixed to positive feelings toward such development based on a desire to strengthen the local economy by providing needed employment, particularly for young people, while recognizing the profound social and economic changes such projects would bring to their community.

In recent years Salmon has experienced substantial growth due to its proximity to major outdoor recreational attractions including the Main Salmon River, the Middle Fork of the Salmon River, and the River of No Return Wilderness Area. The people who moved to Salmon to enjoy the relative isolation and scenic and recreational resources it offers can be expected to want to preserve those qualities, and to hold a more negative view of large-scale industrial development.

2.13.9 Transportation

The study area is served by one U.S. highway and two major state highways. Highway U.S. 93 passes through both Salmon and Challis and connects the study area with Missoula, Montana (150 miles north of Salmon) and Twin Falls, Idaho (190 miles south of Challis). Annual average daily traffic (ADT) on U.S. 93, calculated from 1979 count data, ranges from 330 south of Challis to 3,440 on the north edge of Salmon. Both figures are well below the estimated capacity of the highway which is generally in very good condition. Summer traffic counts would be expected to be somewhat higher but are not readily available at the present time. State Highway 28 connects Salmon with eastern Idaho and the Idaho Falls area 160 miles to the southeast. Traffic counts range from 270 ADT to 2,120 ADT, well below estimated

capacity. State Highways 75 and 21 connect Challis with the Boise area 190 miles to the southwest. The route is winding and mountainous, but has ample capacity for the 670 to 850 ADT traffic loads that it carries.

Cobalt and the Blackbird Mine site are only accessible to surface transportation via gravel surface roadways. Access from the south and Challis is the Morgan Creek Road, 38 miles of which is gravel surfaced. The Panther Creek Road connects with the Salmon River Road on the north which ties into U.S. 93 at North Fork approximately 20 miles north of Salmon. Approximately 25 miles of the total 65 miles to Salmon via this route is gravel surfaced. The shorter route to Salmon is via Williams Creek Road and either Napias Creek Road or Deep Creek Road. This route is 34 to 38 miles long, including 6 miles of U.S. 93 south of Salmon, which is gravel surfaced, except for 10 miles.

Surface condition of all gravel road sections is currently fair to poor, and all routes have numerous points where impaired sight distances restrict safe travel speeds. Grades on all roads except Napias Creek Road are considered mild to acceptable. Portions of Napias Creek Road are very steep, exceeding 20 percent grades at some points. In addition, all of the gravel roads except the Salmon River Road are considered too narrow for free flowing, two-way traffic. Traffic volumes on the gravel roads average from 15 to 82 vehicles per day except on the lower sections of Williams Creek Road and Salmon River Road where resident local traffic increases the daily average to 450 and 370 vehicles respectively.

Both Lemhi and Custer Counties have regular, scheduled bus service operating daily. The nearest railhead, and the only rail service in the study area, is at Mackay, 50 miles southeast of Challis. Both Lemhi and Custer Counties have airports, located at Salmon and Challis respectively. Both have hard surface runways from 4,000 to 4,500 feet long and both offer charter service. Neither county has scheduled air service. In addition to the county airports, there is a helicopter landing site near the town of Cobalt.

2.14 Cultural Resources

A cultural resource investigation was conducted in the project area in the summer of 1980. The surveyed land included any area likely to be affected directly or indirectly by project construction or operation and any site likely to contain cultural resources. No prehistoric sites were discovered in the course of the survey. Existing records were reviewed along with the National Register of Historic Places and no sites listed or determined eligible by the Secretary of Interior are located within the project area.

Reasons for the lack of prehistoric sites include the steepness and narrowness of the drainage, the presence nearby of more suitable travel corridors such as Panther Creek and the Salmon River, and the fact that historic mining activities have severely

impacted those areas most likely to contain such sites, such as level areas in drainage bottoms. The nearest prehistoric sites are located outside of the drainage. They are open lithic scatters located on flats adjacent to Panther Creek.

The survey located three cabins in upper Blackbird Creek. There are no records of these cabins on the Government Land Office or Mineral Survey Plats. The age of the cabins is unknown but may date anywhere from the 1890's to the late 1940's. The cabins are in very poor condition, and they will be evaluated for possible historic significance.

The rocks of the Blackbird Creek drainage are believed to belong to the Precambrian Yellowjacket Formation. This geologic setting precludes the possibility of paleontologic resources (fossils) occurring in the project area.

3.0 EVALUATION CRITERIA

3.1 Introduction

Criteria are statements on which a judgement or decision can be based. This chapter of the EIS presents the criteria developed in order to evaluate each of the project alternatives and to select the preferred alternative. The evaluation criteria developed for the analysis of the environmental impacts of the proposed Blackbird Project were derived from several sources including:

- Public and agency recommendations
- Laws, executive orders, and regulations
- Goals and objectives of Forest Service plans and policy statements
- Tests of legal, technical, economic, social, and political feasibility

The main sources for the evaluation criteria are cited at the end of this chapter.

The initial step in developing the evaluation criteria was the identification of public issues, management concerns, and opportunities regarding implementation of the Blackbird Project (see Chapter 1). The results of these efforts were incorporated into the "Scoping Document for Noranda Mining Inc.'s Blackbird Project." Based on this document, criteria were developed to evaluate the relative effects of implementation of each project alternative. Certain issues or concerns were eliminated because their application as criteria did not allow evaluation of the project options and alternatives.

The evaluation criteria were designated as significant criteria or general criteria. The significant criteria are those representing the most significant issues and concerns or those considered as unique constraints on the project (i.e., threatened and endangered species and cultural resources). The remaining criteria were designated as general criteria and were applied to the alternatives in order to evaluate relative differences in beneficial and adverse effects of implementation. The general criteria were not ranked as highly in the evaluation process as the significant criteria but were important in the selection of the best alternative.

In general, the alternative which causes the least adverse effect to the criteria would be considered the environmentally preferred alternative. In some cases (i.e., air quality) there are quantifiable legal standards which cannot be exceeded. The criteria have been selected so as not to exclude from consideration any alternatives that do not satisfy all of the criteria.

3.2 Significant Criteria

1) Minimize adverse effects on surface water quality.
2) Minimize adverse effects on fishery resources.

3) Minimize adverse effects on wildlife or wildlife habitat.

4) Minimize adverse effects on socioeconomic resources (housing, schools, social services, etc.) and maximize positive effects.

5) Effectively contribute to production of cobalt and reduce dependence on foreign sources.

6) Minimize adverse effects on the River of No Return Wilderness.

7) Minimize adverse effects on the segment of the Salmon River designated as Wild and Scenic.

8) Comply with existing local, state, and federal laws and regulations.

9) Maximize economic feasibility for both the public and private sector.

10) The alternative should be technically feasible.

11) Project components (tailings dam, etc.) should be designed and located to ensure long-term stability and minimal maintenance following project termination.

3.3 General Criteria

12) Minimize adverse effects on archeological, historical, and paleontological resources.

13) Minimize reduction of surface water quantity.

14) Minimize adverse effects on groundwater quality.

15) Minimize adverse effects on air quality.

16) The alternative should be as consistent as possible with requirements of the Forest Service's Red Rock Peak Land Use Plan.

17) Provide long-term reclamation and stability of newly disturbed areas.

18) Provide for maximum public safety on National Forest roads.

19) Increased electricity demands should minimize adverse effects on existing service or reliability.

20) Minimize adverse effects on existing range, timberland, and recreation programs on the Forest.

21) Minimize adverse effects on existing Forest Service research programs.

3.4 Sources of Information

- Scoping Document for Noranda Mining Inc.'s Blackbird Project
- National Environmental Policy Act of 1969 (42 USC 4321-4327)
- CEQ Regulations for Implementing the Procedural Provisions of NEPA (40 CFR 1500-1508)
- Forest Service NEPA Process, Final Implementation Procedures (FSM 1950)
- National Forest Management Act of 1976 (PL 94-588)
- Federal Water Pollution Control Act, as amended (86 Stat. 816)
- Multiple Use Sustained Yield Act of 1960
- Resources Planning Act of 1974
- Resource Conservation and Recovery Act of 1976
- Clean Air Act, as amended (42 USC 1857)

- The Endangered Species Act of 1973, as amended
- Executive Order 11514, March 5, 1970--Protection and Enhancement of Environmental Quality
- Antiquities Act of 1906 (34 Stat. 225)
- Executive Order 11593, dated May 14, 1971--Protection and Enhancement of Cultural Environment (also, 36 FR 8921, 16 U.S.C. Sec. 470, May 31, 1979)
- National Historic Preservation Act of 1966, as amended (15 USC 470)
- Archaeological Resources Protection Act of 1979 (PL 96-95)
- Fish and Wildlife Act of 1956 (16 USC 742a, et seq.)
- Fish and Wildlife Coordination Act (16 USC 661-666c)
- Protection of Fish (Section 36-902, Idaho Code)
- Executive Order 11988 (Floodplain Management)
- Executive Order 11990 (Protection of Wetlands)
- Clean Water Act of 1977
- Safe Drinking Water Act (PL 93-523)
- State of Idaho "Water Quality Standards and Wastewater Treatment Requirements" (1973 and draft revisions, January 1980)
- Department of Transportation Act (49 USC 1165 [b][a])
- Noise Control Act of 1972 (PL 92-574)
- Forest Service Manual Regulations
- Mining and Minerals Policy Act of 1970
- National Materials and Minerals Policy, Research and Development Act of 1980
- Minerals Availability Act of 1977

4.0 ALTERNATIVES CONSIDERED

4.1 Introduction

An overview of Chapter 4 can best be presented by outlining the objectives which will be satisfied in the various sections of this chapter:

- Describe the major components necessary for project expansion.
- Describe the proposed options for each project component.
- Document the planning process used to formulate alternatives for the Blackbird Project.
- Select and display reasonable alternatives that utilize the viable component options.
- Document the rationale for eliminating some component options and alternatives because of major technical or economic constraints.
- Based upon probable effects of the Blackbird Project on the environment, present a list of management constraints and guidelines and corresponding mitigation measures for each alternative, which could be implemented by Noranda, which allow mining and associated activities in the production of cobalt and copper, and which are compatible with other multiple use activities of the area.
- Develop and describe a monitoring program which will provide timely feedback on the implementation of the management constraints and guidelines.

Three important definitions are included at the beginning of this chapter. Project Components are the major activities which, when linked together, form the Blackbird Project. The major project components for an underground hard rock mining and milling operation include:

- Mine and mine service facilities
- Waste rock disposal areas
- Concentrator
- Tailings disposal facility
- Water supply
- Transportation service corridors

These major components, as well as other construction and operational requirements will be discussed in this chapter. Options are the various alternative methods or locations by which each project component could be accomplished or located. Alternatives are groupings of viable component options linked together into functional systems. The project alternatives for this EIS are derived from these groupings.

The methodology employed in developing project alternatives used the following steps:

- Identify project components and their options.
- Describe the potential component options and eliminate from further study those options which are not viable.

- Formulate feasible alternatives based on viable component options.
- Describe these alternatives.

4.2 Project Components and Options

Noranda Mining Inc. (Noranda) has reactivated the Blackbird Mine and rehabilitated existing facilities to allow ore production at a rate of 300 tons per day (tpd) under a pilot operation. The objectives of this operation are to continue mine exploration and development and to produce cobalt concentrate to conduct refining test work. However, it would not be economically feasible to continue operations at this low production level. Based on the results of this pilot operation, Noranda proposes to expand the production rate of the Blackbird Project to 1,200 tpd. This proposal would utilize existing and presently rehabilitated facilities to the maximum extent possible to reduce new construction requirements and to allow utilization of improvements already made. Higher production levels (e.g., 2,000 tpd) would be beyond the capacity of the planned improvements to the mine and mill facilities.

The production rate of the Blackbird Project is scheduled to increase in steps corresponding to mine development and facilities expansion and construction. The project is scheduled to reach 1,200 tpd by 1986 resulting in an annual production of approximately 4.6 million pounds of cobalt and 9.3 million pounds of copper. The total extent of mineable ore reserves is presently unknown. Noranda Mining Inc. and Noranda Exploration Inc. are conducting on-going exploration programs to define reserves. Noranda Mining Inc. efforts are limited to defining proven reserves within the Blackbird Mine Block, while Noranda Exploration Inc. is conducting long-term exploration of the cobalt belt which runs through this mining district. Most of the district exploration effort to-date has been in the central portion of the district, near the Blackbird Mine Block. The current reserves of cobalt in the Blackbird Block are approximately 25,000 tons which represent approximately a 15-year production period for the Blackbird Project. The project life is expected to increase as additional reserves are proven economically mineable.

The Blackbird Project is located on public and private lands within the Cobalt Ranger District of the Salmon National Forest. With the exception of transportation and service corridors and some ancillary facilities approved under the pilot operation, the existing operation is located on approximately 830 acres of patented mining claims held by Noranda. The proposed expansion would require expansion of the existing mill and underground mine workings and construction of a new shaft, tailings disposal facility, water supply system, additional mine and concentrator support facilities, and upgrading and construction of new roads. The tailings disposal facility and the water supply system would be constructed on public lands administered by the Forest Service. All other major components of the project would be located on patented lands.

The work force of the existing operation is approximately 100 people. The construction and operation employment schedule for the proposed expansion is shown in Figure 4-1. Some of the workforce may reside in Company housing at Cobalt, or commute from nearby communities. Cobalt has single status accommodations for approximately 200 workers. During the construction period, a temporary construction camp would be provided at Cobalt to house additional subcontracted construction workers. The mine would be in production 24 hours per day, 5 days per week to supply the concentrator which would operate 24 hours per day, 7 days per week.

4.2.1 Mine and Mine Service Facilities

The Blackbird ore body would be mined by conventional underground cut and fill or undercut and fill mining methods. Various underground mining methods have been tried by previous operators of the Blackbird Mine; they found that because of the friable (easily broken) rock conditions at Blackbird, a filling-type method was required to provide the necessary ground support and to provide safe working conditions for the miners. Surface mining methods were also considered; however, because most of the proven ore reserves occur as narrow veins at depths greater than 1,000 feet, the tons of overburden to be removed for each ton of ore recovered (stripping ratio) prevent this method of mining from being economically feasible.

Proven ore reserves have been identified in the six main ore zones of the Blackbird ore body. Underground development to gain access to the ore deposits would include expansion of the existing underground workings and development of a vertical shaft to the 5900' level. The new shaft would be located in upper Meadow Creek Valley approximately 1 mile upvalley from the concentrator, and new raises to the surface for ventilation would be required in each of the ore zones. A total of 250,000 cubic feet per minute (cfm) of ventilating air would be required for the mine.

When an ore deposit is encountered it would be removed in a series of parallel slices and the void created (stope) would be filled with fill material to provide permanent support for the walls and create the working floor for the next cut. The fill material would consist of a mixture of cement and tailings pumped into the mine as a slurry from two backfill plants on the surface.

The mobile surface equipment necessary to operate the Blackbird Mine is presented in Table 4-1. A variety of diesel, electrical, and compressed air power equipment would be used for development and production mining. Diesel-powered equipment would be equipped with exhaust-air scrubbers and noise suppressors as necessary to comply with the Federal Mine Safety and Health Act requirements. Compressed air would be distributed throughout the mine workings as would water for dust suppression and drilling. To provide a comfortable working environment and prevent water lines from freezing during cold weather, propane heaters would be used to heat the mine air

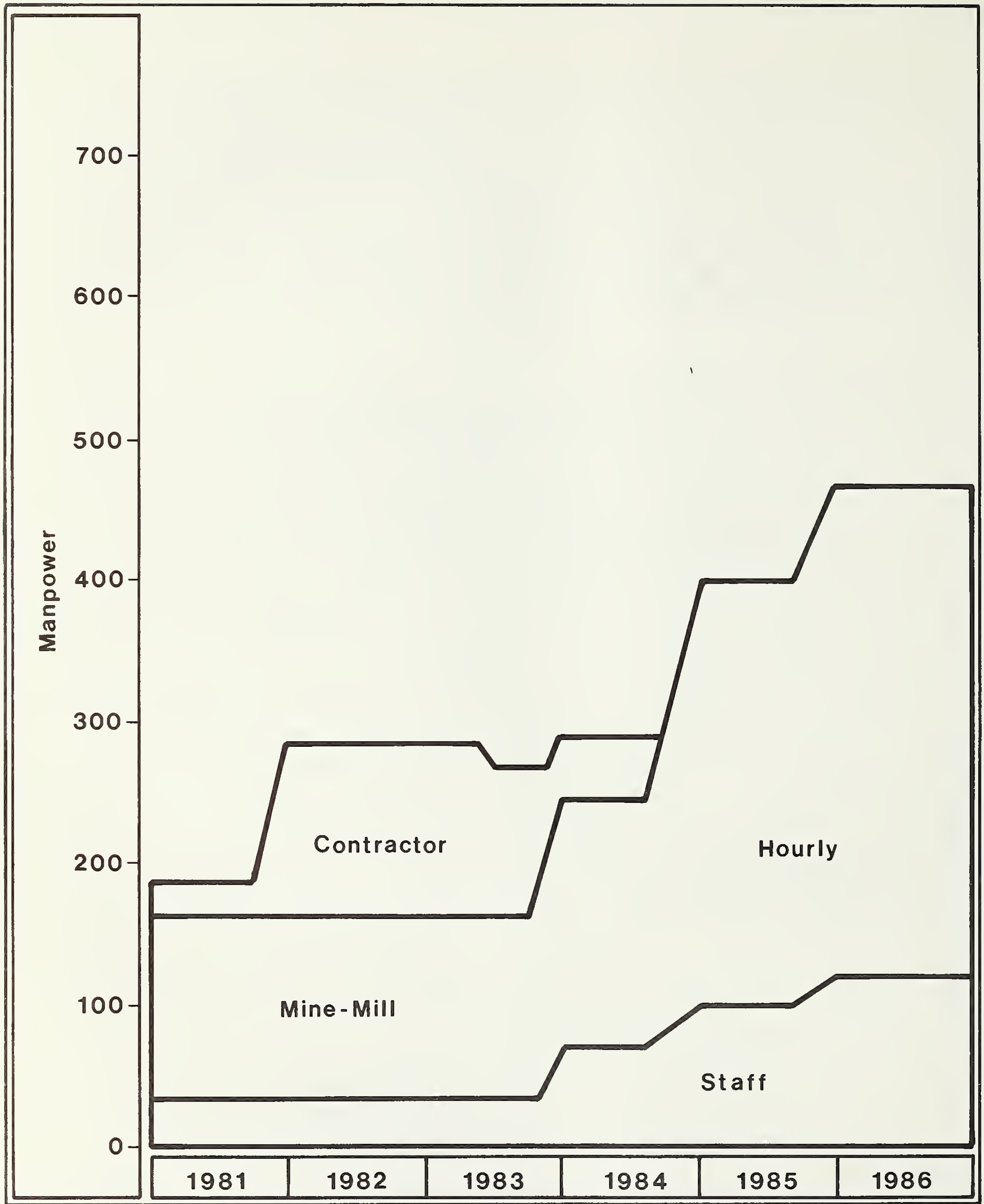


Figure 4-1 Construction and Operation Employment Schedule

Source: Noranda Mining Inc.

supply. Rock anchors, shotcrete, and timber would be used to provide primary and secondary ground support in the workings. The type and quantity of support materials necessary to provide safe working conditions would vary based on the strength or competency of the rock. Rail track ballast, and mine road dressing would be required to expand and maintain the mine haulage routes. Crushed talus, mined from permitted borrow areas, would be the source of track ballast and road dressing materials. Other supplies and materials would be purchased and stockpiled on-site for use as necessary.

TABLE 4-1

MOBILE SURFACE EQUIPMENT FOR
MINE AND MILL OPERATION

Present Fleet		Expected Additions at Ultimate Mine Size	
Pickups	36	Dozer (D8)	1
Ambulance	1	Concentrate Trucks (20 ton)	8
Buses	2	Boom Truck	1
Bobcat Loader	1	Dump Truck	1
Front-end Loaders	2	Frontend Loader	1
Grader	1	Bus	1
Boom Truck	1	Forklift	1
Miscellaneous Heavy Trucks	3	Pickups	2
Crane	1		
Backhoe	1		

Source: Noranda Mining Inc.

The existing 6850' level would continue to be the main haulage level during the early years of production. Ore would be hauled out of the mine using the existing track haulage and dumped into a coarse ore bin near the 6850' portal for primary crushing and subsequent transfer to the concentrator. Coarse ore storage would be expanded from the existing 250-ton to 1,000-ton capacity by constructing an additional coarse ore bin adjacent to the existing facility.

After the new shaft and mine service facilities are constructed and mine development proceeds below the 6600' level, rock from these lower levels would be hauled through a new haulage drift and hoisted out through the new shaft. The concrete-lined service and hoisting shaft would be 18 feet in diameter and divided into four compartments. The shaft collar and head frame would be located within the

new mine service complex. The ore and waste rock from the shaft would be loaded directly on to 20-ton trucks and transported to either the coarse ore storage bins at the 6850' level or waste rock storage areas.

In addition to the shaft facilities, the new mine service complex would provide a changehouse and other facilities to service the underground work force, equipment repair shop, warehouse, and administrative office space. Waste water from the service complex would be collected and treated at a 9,000 gallons per day biological rotary disc treatment plant. The effluent from the treatment plant would be chlorinated and discharged to Meadow Creek in accordance with Noranda's National Pollutant Discharge Elimination System (NPDES) Permit. The present schedule calls for construction of the shaft and service complex to begin in 1982 and operations to commence by 1984.

Development and production mining would result in an average annual production of approximately 31,000 cubic yards (cy) or 56,000 tons of waste rock. The annual production would vary considerably between years depending primarily on the amount of new development workings constructed. The greatest amount of waste rock would be produced in the early years of mine development corresponding with the development of the new shaft and deeper mine workings. The waste rock would be used wherever possible as backfill or road dressing within the mine; however, the characteristics of the waste rock would limit use primarily to backfilling of stopes. Excess waste rock would be removed through the ore haulage routes or existing adits. The ultimate disposition of this material will be discussed in Section 4.2.2, waste rock disposal.

Congruent with a Compliance Schedule Order with the Idaho Department of Health and Welfare (Appendix B), mine water from the Blackbird Mine would continue to be collected and treated in accordance with the requirements of Noranda's NPDES Permit. These requirements are presented in Table 4-2. The water would be treated at the existing treatment plant, located adjacent to the 6850' portal, by hydrated lime neutralization and flocculation to raise the pH and remove dissolved metals. The capacity of the existing 400 gallon per minute (gpm) treatment plant would be increased as necessary to meet the additional requirements resulting from expansion of the underground workings. The anticipated capacity of this plant at full development is expected to be approximately 900 gpm. This expansion of the capacity would require increasing the size of the principal reaction vessels and the chemical storage facilities and may require construction of an additional building. The monthly supply requirements and on-site storage volumes for chemicals to operate the treatment plant up to its capacity of 900 gpm are included in Table 4-3.

Mine water above the 6850' level would continue to be diverted to the 6850' level and transported through the mine by gravity in open channels to a concrete surge tank at the water treatment plant site. Water from workings below the 6850' level would be collected by a series of sumps and pumped to the 6850' level for transport to the treatment plant. The flow rate from the surge tank to the treatment works is

controlled automatically from a central control panel. It would be possible to divert the mine water to the tailings impoundment for emergency storage during long-term facility maintenance or repair.

TABLE 4-2

NPDES PERMIT REQUIREMENTS FOR MINE/MILL DISCHARGE

Parameter	mg/l Monthly Avg.	mg/l Daily Max.	kg/day (lbs/day) Monthly Avg.	kg/day (lbs/day) Daily Max.
Total Suspended Solids	30	45	54 (119)	81 (178)
Arsenic	0.5	1.0	0.9 (2.0)	1.8 (4.0)
Cadmium	0.05	0.1	0.1 (0.2)	0.2 (0.4)
Copper	0.15	0.3	0.3 (0.6)	0.5 (1.2)
Mercury	0.001	0.002	0.002 (0.004)	0.004 (0.008)
Lead	0.3	0.6	0.5 (1.2)	1.1 (2.4)
Zinc	0.5	1.0	0.9 (2.0)	1.8 (4.0)
pH	between 6.0 and 9.5			

Source: National Pollutant Discharge Elimination System (NPDES) Permit No. ID-002525-9.

The end products from the treatment process are the treated water and a high density sludge containing the complexed metals. A portion of the treated water would be returned to the mine through the non-potable water distribution system and used for drilling, dust control, and other non-potable uses. The remainder of the treated water would be discharged in accordance with the NPDES Permit requirements to Blackbird Creek.

At the anticipated treatment rate of 900 gpm, neutralization would result in the production of approximately 1,600 gallons of sludge per day which would require disposal. Currently, the waste water treatment sludge is stored in the sludge basin constructed as part of the pilot operation. The sludge would be pumped from the treatment plant to the sludge basin for storage and dewatering by infiltration and evaporation. The sludge basin has a 300,000 gallon storage capacity which would be more than adequate to contain the sludge produced during the pilot operation and the early phases of project expansion.

After the new tailings dam facility is completed, the sludge basin would be abandoned, and the sludge would be pumped as a slurry through the tailings disposal pipeline to the tailings pond for permanent disposal. The abandoned sludge basin would be reclaimed to Forest Service standards as specified in the Environmental Assessment prepared for Noranda's pilot operation.

TABLE 4-3

MONTHLY MATERIAL REQUIREMENTS (TONS)
FOR 1,200 tpd OPERATION

Description	Mill	Mine Water Treatment Plant (900 GPM)	Reagent Storage Volume
MILL REQUIREMENTS			
Lime	50	50	80
Flocculant (Polymer)		1	3
Grinding Rods/Balls	36		
Reagents			
Alcohol Frother	2		4 (450-lb drums, liquid)
Copper Sulfate	18		36 (80-lb dry bags)
Calcium Oxide or Sodium Carbonate	40		80 (bulk tank, dry)
Sulfuric Acid	20 (5,000 gal)		40 (10,000-gallon bulk tank, liquid)
Sodium Cyanide	0-3		3 (300-lb drums, dry)
Xanthate	14		25 (300-lb drums, dry)
Other collectors	2		5 (450-lb drums,
MINE REQUIREMENTS			
Diesel & Gasoline	1,000 (323,000 gal)		
Timber	300 (240,000 board ft)		
Split Sets (Rock Bolts)	7		
Wire Mesh	10		
Explosives	20		
Cement	1,500		
Rail	15		
Pipe	16		
Other Supplies	40		

Source: Noranda Mining Inc.

Upon completion of operation of the Blackbird Mine, the treatment plant, shaft facilities, and other structures, equipment, and supplies would be removed and reclaimed or disposed of in compliance with Noranda's Reclamation Plan (Appendix C). Mine entrances would be sealed to prevent inflow of water to the mine workings and to ensure safety. Portals would be sealed with hydrostatic bulkheads to minimize acid mine drainage, unless investigations conducted during operation reveal alternative methods to provide equal or better means of controlling or managing mine water drainage. Any alternative measures defined would be proposed to the appropriate regulatory authorities (IDHW, EPA, and MSHA) for consideration and approval.

4.2.2 Waste Rock Disposal

The underground development to gain access to the known ore reserves and the excavation of the new shaft would result in the production of an estimated 700,000 tons of waste rock. The waste rock would consist of material sizes ranging from silt to 18-inches. Most of the material would be 2 to 18 inches in size. This material would be removed from the underground mine workings and used for construction material, backfilled into mined out sections of the mine, or deposited at established waste rock disposal areas.

Annual waste rock production is estimated at 28,000 tons in 1984 and 56,000 tons annually from 1985 through 1996 for a total of 700,000 tons. During the early years of the mine expansion and development, all the waste rock produced would be used as rockfill for the construction of tailings and/or water supply embankments. This material would be removed from the mine through the 6850' ore haul level, loaded into trucks at the 6850' portal, and hauled to the construction sites. Waste rock not used for construction would be removed from the existing adits at the 7080', 7250', and 7410' levels and deposited on existing side hill disposal areas near the adits in accordance with measures outlined in the Reclamation Plan.

The quantity of additional waste rock to be deposited at each of these existing disposal areas and the area of new surface disturbance is shown in Table 4-4. The shape of the existing disposal areas and the planned expansions are displayed graphically in Figure 4-2. The existing culvert at the 7080' waste pile, installed by Noranda as part of their pilot operation, will continue to divert runoff from the ephemeral stream that parallels this waste disposal area to downstream of the proposed expansion.

The effect of the existing waste rock disposal areas on the water quality of Blackbird Creek will be evaluated during a planned three-year nonpoint source pollution study scheduled to begin by July 1, 1982; this study is being conducted by Noranda as part of a Compliance Schedule Order with the Idaho Department of Health and Welfare. Upon completion of operation of the Blackbird Project, the new waste rock disposal areas would be stabilized and reclaimed, as discussed in Noranda's conceptual Reclamation Plan included as Appendix C.

TABLE 4-4

WASTE ROCK AMOUNTS AND SURFACE DISTURBANCE OF NEW DISPOSAL AREAS

7080' site	49,300 tons - 2.10 acres
7250' site	26,000 tons - 0.26 acres
7410' site	7,000 tons - 0.25 acres

Source: Noranda Mining Inc.

4.2.3 Concentrator

The concentrator is used to separate the desired mineral particles, in this case cobalt and copper, from the associated valueless constituents of the ore, referred to as gangue. The capacity of the existing 300 tpd froth flotation concentrator would be increased to 1,200 tpd in order to process the ore from the Blackbird Project. The froth flotation process is the most efficient and widely used ore concentration method in the mining industry.

Prior to rehabilitating and upgrading the existing concentrator as part of the pilot operation, construction of a new, larger capacity concentrator was considered. Three locations for this concentrator were considered: on the existing tailings dam on West Fork of Blackbird Creek, at the existing concentrator location, and an underground facility to be located about 3 miles down Blackbird Creek from the existing concentrator. Based upon further definition of the Blackbird Mine Block, mine production limitations, engineering feasibility and economic considerations, Noranda decided the only viable option is to expand the existing mill to 1,200 tpd capacity. The Forest Service concurred with Noranda's decision in a meeting held in December 1980.

Figure 4-3 presents a simplified flow diagram of the flotation process. Basically, the process includes grinding the ore into a fine powder, chemically treating this pulp to create conditions favorable for the attachment of desired minerals to air bubbles generated by agitation of the pulp, and collection of the mineral-laden froth from the surface of the flotation tank. The end products of the flotation process are a mineral concentrate produced by dewatering the mineral-laden froth, and tailings consisting of the valueless constituents of the ore collected in the bottom of the flotation tanks. Since Noranda is independently collecting and concentrating two metals, cobalt and copper, the process requires separate flotation circuits for each of these minerals. This differential flotation is accomplished by

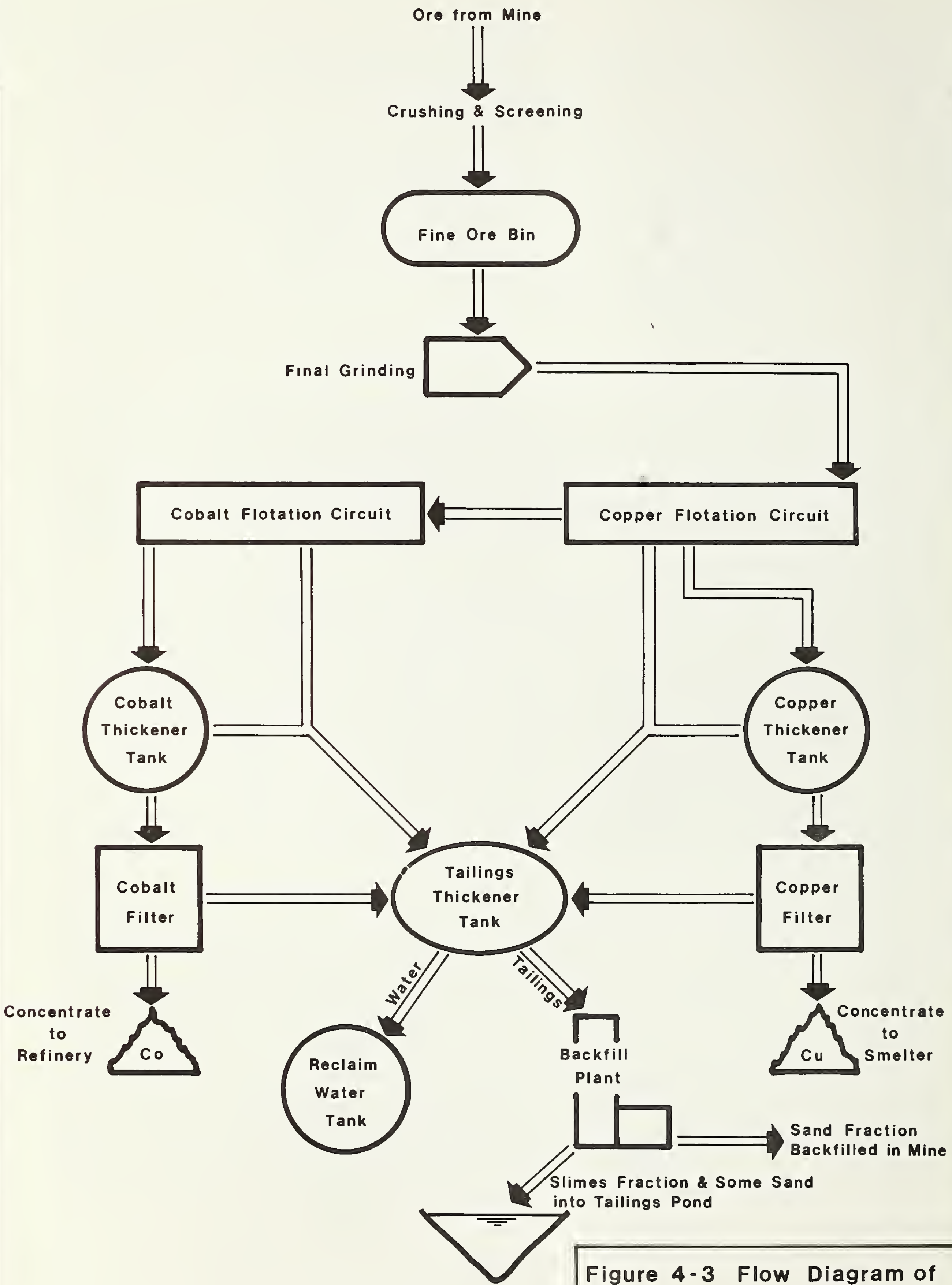


Figure 4-3 Flow Diagram of Flotation Process

Source: Noranda Mining Inc.

modifying the chemical conditions in the flotation tanks of the copper and cobalt circuits.

Run-of-mine ore from the Blackbird Mine would be crushed to about 5/8-inch material size in the primary crushing circuit located at the 6850' portal (Figure 4-4). The existing components, consisting of one jaw crusher and one symons screen and one cone crusher, have a capacity of 100 tons per hour (tph) which would be adequate to supply the expanded concentrator. The run-of-mine ore would be transported from the coarse ore storage to the primary crushing circuit by means of a pan-feeder. Crushed ore would be transported from the crusher to a new fine ore bin to be located adjacent to the concentrator by means of the existing 22-inch covered belt conveyor. The existing conveyor has a capacity of 150 to 200 tph which would not have to be increased for the 1,200 tpd operation.

The only planned modification of the existing crushing and ore transport facilities is to provide additional insulation and perform other general maintenance activities. Fugitive dust is presently controlled by means of dry bag-type dust collectors installed as part of the pilot operation. The existing 500-ton fine ore bin would be replaced by bins with a total capacity of 3,000 tons to provide a continuous ore supply to the concentrator. The new fine ore storage would be completely enclosed and heated (Figure 4-4).

Additional concentrator capacity would be required for the 1,200 tpd operation. This would involve providing additional flotation cells to both the copper and cobalt flotation circuits and expanding concentrate handling facilities. These expanded components would be housed primarily within the existing refurbished concentrator building with some expansion to the north and west to house additional grinding and concentrate handling capacity. The operation of the concentrator at the expanded capacity would require the storage and use of additional quantities of the reagents used in the flotation process. A list of the reagents to be used in the flotation process, monthly requirements, and information on the storage containers for these reagents is provided in Table 4-3. Approximately a one-month supply of these reagents would be held in storage. With the exception of the reagents to be stored in bulk tanks, the reagents would be stored and mixed in a new reagent storage building to be constructed adjacent to the concentrator (Figure 4-4). This building would be a containment structure and any accidental spillage would be collected and returned to the reagent containers or entered into the flotation process.

The sulfuric acid and lime or soda ash bulk tanks would be located adjacent to and up gradient of the concentrator building to permit gravity feed of these reagents (Figure 4-4). Impermeable catchment basins of sufficient size to hold the total volume of the tanks would be constructed around these tanks to contain any accidental spillage. Any spillage that may occur would be handled in accordance with Noranda's Spill Prevention Control and Countermeasure Plan. All reagents would be transported

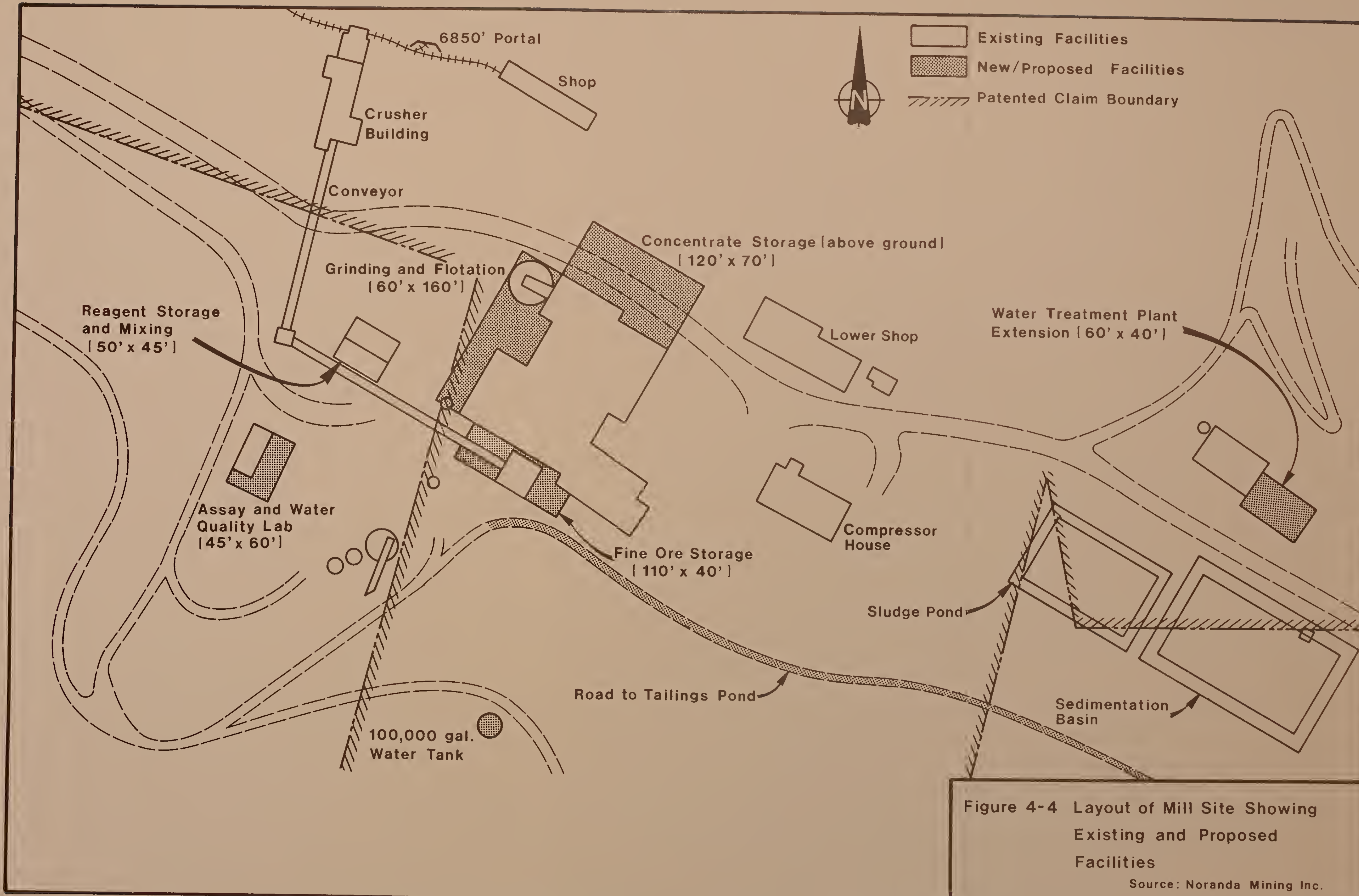


Figure 4-4 Layout of Mill Site Showing Existing and Proposed Facilities

Source: Noranda Mining Inc.

in compliance with Forest Service, Department of Transportation, and other pertinent agency regulations and guidelines.

A typical monthly material balance for the 1,200 tpd concentrator is shown in Table 4-5. The concentrates would be dewatered by means of thickeners and filters to 10 to 12 percent moisture and stored in bins. The concentrate from the bins would be loaded directly into 20-ton concentrate haul trucks by gravity feed for transport to the refinery, which will be located in southern Idaho or northern Utah. The new concentrate storage and load-out facility would be constructed within the existing structure, if possible.

TABLE 4-5

MONTHLY MATERIAL BALANCE FOR 1,200 TPD CONCENTRATOR

		Assay		Accounted For	
	Tons	% Cu	% Co	% Cu	% Co
Ore Feed (mill head)	36,000	1.1	0.60	100.0	100.0
Copper Concentrates	1,000	29.0	0.60	72.7	2.8
Cobalt Concentrates	3,200	1.0-3.0	6.00	24.1	88.4
Tailings	31,800	0.04	0.06	3.2	8.8

Source: Noranda Mining Inc.

The waste material from the concentration facilities (tailings) would be dewatered to approximately 50 percent water by means of a thickener, neutralized with soda ash or lime to raise the pH to about 8, and pumped through two 4-inch slurry lines to one of two backfill plants. The purpose of the backfill plants is to remove the coarse particle fraction from the tailings to provide a material that, when mixed with cement, will provide a suitable backfill material for the cut and fill mining operation. The size fraction suitable for backfill were determined by Queens University, Kingston, Ontario on tailings produced in the pilot operation. The two proposed backfill plants would be located in Meadow Creek Valley, one approximately 1/2-mile above the concentrator and the other approximately 1 mile above the concentrator. These two locations are required to provide for efficient gravity feed of backfill material to the mine workings.

A schematic drawing of a backfill plant is shown in Figure 4-5. At this facility the tailings would be separated into two particle size fractions, those less than and those greater than 400 mesh, by means of a cyclone classifier. The material less than 400 mesh, referred to as slimes, would be decanted in a 5,000 gallon decant tank and pumped as a slurry through two 4-inch tailings lines to the tailings pond for disposal. Approximately 40 percent of the tailings produced would be slimes and would

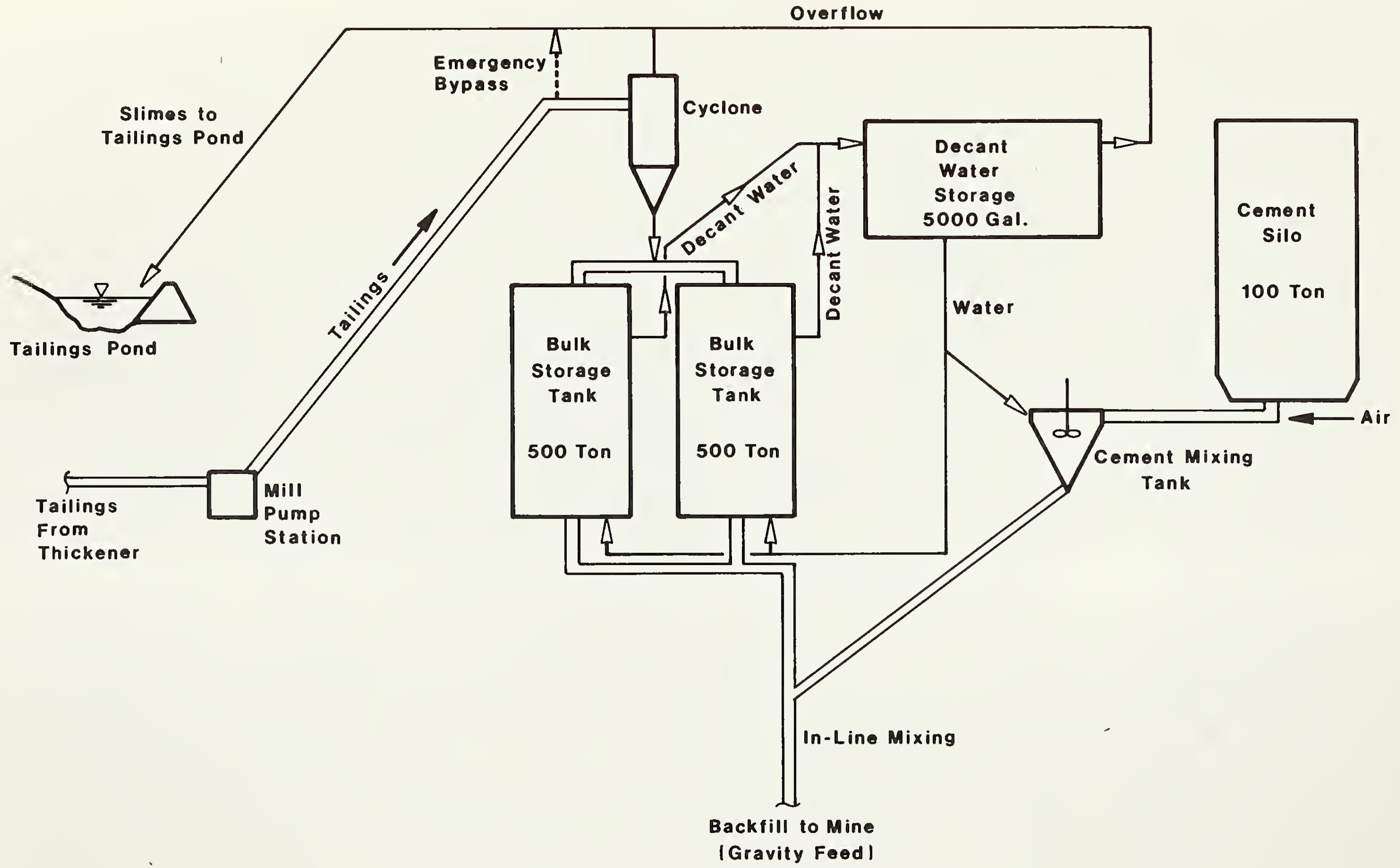


Figure 4-5 Schematic Diagram of Backfill Plant

Source: Noranda Mining Inc.

be delivered to the tailings disposal facility. This represents approximately 500 tons of tailings material per day which would require disposal.

The larger particles, or sands, would be mixed with cement at a ratio of approximately 20 to 1, repulped to the desired density with the decant water, and pumped to the mine areas that require fill. All surface lines carrying tailings or backfill materials would have interception structures adjacent to them to prevent any spills from entering watercourses.

To minimize makeup water requirements and the need to discharge water from the concentration process, water would be recycled to the maximum extent possible. Approximately 75 percent of the water used in the flotation process would be reclaimed for use in the flotation circuits, and the remainder would be lost as residual moisture in the concentrates and tailings. At 1,200 tpd capacity, approximately 200 gallons per minute or 320 acre feet per year of makeup water would be required to compensate for these losses. Any discharges from this facility would be in accordance with Noranda's NPDES Permit.

Upon completion of operation of the Blackbird Project, the concentrator, backfill plants, and other facilities would be removed from the site. Unused reagents would be removed or detoxified and disposed of in accordance with applicable regulations (RCRA).

4.2.4 Tailings Disposal Facility

There are two basic methods for the disposal of tailings from an underground mining operation, backfill of the tailings to the mined out areas and surface disposal. The need to use cut-and-fill techniques for the Blackbird ore block requires the use of a combination of these two methods. Because of the swell factor and higher porosity of the settled backfill compared to the bulk ore, only approximately 60 percent of the tailings produced during the concentration process is required to fill the voids created by mining the ore. Based on the results of tests conducted by Queens University (Nantel and Archibald 1980) on samples of Blackbird tailings, the sand fraction (coarse particles) alone would provide the total backfill requirements and provide a good working surface for cut-and-fill mining. The inclusion of slimes (fine particles) into the backfill was found to reduce percolation rates below acceptable standards (approximately 4 inches per hour) for backfill and was not recommended.

Site and laboratory investigations to provide information on the design of potential surface tailings disposal facilities were conducted by Wahler Associates in 1979-1980 (Wahler 1980). Because of the functional interrelationship of the tailings disposal facility and other existing components and the topography of the Blackbird Creek drainage, options for surface disposal facilities are limited. Based on the results of Wahler's investigations, two viable locations for a conventional tailings

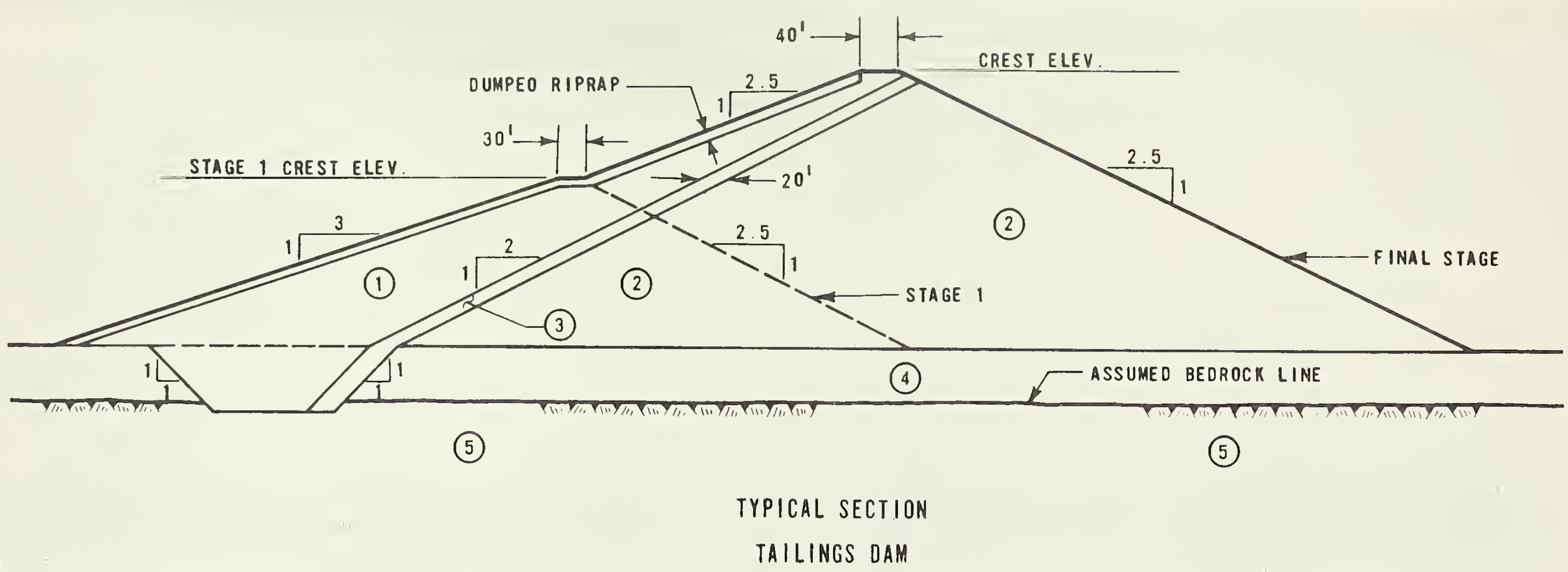
impoundment have been identified which would provide for safe, efficient storage of the tailings to be generated during the operation of the Blackbird Project. One of these sites is located in upper Blackbird Creek, and the other in lower Blackbird Creek. A third potential site located on West Fork of Blackbird Creek immediately upstream of the existing tailings impoundment was given consideration, but was determined to be nonviable based on geotechnical and economic considerations.

Exploration drilling and conceptual engineering have been completed at each of the two candidate sites. The conceptual design completed by Wahler Associates took into consideration the dam safety requirements of the Idaho Department of Water Resources and the Forest Service. The final design and detailed specifications will be reviewed and approved by the Idaho Department of Water Resources to ensure that construction is accomplished in an acceptable manner and that necessary controls and abandonment plans are provided.

The proposed tailings dam would be a zoned earth and rock fill structure having a sloping upstream impervious core, a downstream rockfill shell, and a filter-transition zone between the core and the downstream shell (Figure 4-6). A positive foundation cutoff would be provided beneath the core zone of the dam to prevent underseepage of water. The tailings dam would be constructed in stages with the first stage large enough to store the first several years of production. The tailings embankment would subsequently be raised in three to five year intervals, as required, depending on operational conditions during the life of each stage.

Preliminary tailings impoundment design considerations for the two sites at Stage I and potential ultimate capacity is provided in Table 4-6. At ultimate capacity these impoundments could provide storage for 8 million tons of tailings, or approximately 40 years of production at 1,200 tpd. At this ultimate capacity, the dams at the upper and lower locations would be 285 and 213 feet in height respectively. Based on the diamond drilling and other geotechnical studies completed on these two sites, no conditions were encountered which would significantly affect or preclude the construction of a tailings impoundment with the ultimate design conditions at either of these sites.

Storm water runoff from the drainage area above and around the tailings dam sites would be controlled during operation through a combination of stream diversion and surcharge storage within the tailings impoundment. Storm runoff for flood flows less than the 100-year flood would be diverted around the tailings impoundment area. For the upper Blackbird site, runoff from Blackbird Creek and tributaries would be diverted by means of a water supply/diversion dam located immediately upstream of the tailings impoundment. Runoff in excess of the available storage capacity of the water supply reservoir would overflow into an open diversion channel and be transported to below the downstream toe of the tailings dam. The roadway that encircles the impoundment would intercept any runoff water and divert it from the tailings



LEGEND

ZONE	MATERIAL TYPE	
1	IMPERVIOUS CORE	
2	ROCKFILL SHELL	
3	FILTER/TRANSITION MATERIAL	
4	ALLUVIUM	FOUNDATION MATERIAL
5	BEOROCK	

Figure 4-6 Typical Cross Section of Tailings Dam

Source: Noranda Mining Inc.

TABLE 4-6

TAILINGS DISPOSAL AND WATER DIVERSION DAM PRELIMINARY ENGINEERING DATA

	Tailings Dam - Upper Blackbird		Tailings Dam - Lower Blackbird		Water Supply Diversion Dam
	Stage I	Ultimate	Stage I	Ultimate	
Embankment Type	Earth & Rockfill	Earth & Rockfill	Earth & Rockfill	Earth & Rockfill	Earth & Rockfill
Pond Surface Area	18 ac	54 ac	85 ac	169 ac	18 ac
Storage Capacity	725 ac-ft	4,238 ac-ft	1,100 ac-ft	4,320 ac-ft	550 ac-ft
Maximum Storage Elev.	7,075 ft	7,175 ft	5,590 ft	5,665 ft	7,190 ft
Crest Elev.	7,084 ft	7,185 ft	5,612 ft	5,688 ft	7,200 ft
Max Height Below Crest	184 ft	285 ft	137 ft	213 ft	115 ft
Crest Length	290 ft	450 ft	520 ft	720 ft	530 ft
Crest Width	30 ft	40 ft	30 ft	40 ft	30 ft
Upstream Slope	3:1	3:1/2.5:1	3:1	3:1/2.5:1	2.5:1
Downstream Slope	2.5:1	2.5:1	2:1	2:1	2:1
Embankment Volume[1]	644,000 yd^3	2,600,000 yd^3	560,000 yd^3	2,200,000 yd^3	267,000 yd^3

[1]Embankment volume above original ground elevation.

Source: Noranda Mining Inc.

impoundment to below the dam by means of an open ditch running adjacent to the upslope side of the road.

The lower Blackbird site would require the diversion of Blackbird Creek, West Fork Blackbird Creek, and Ludwig Gulch. The runoff from these drainages would be diverted by means of zoned embankment dams to diversion tunnels which would transport normal stream flows and flood flows less than the 100-year storm runoff around the tailing impoundment area. Each of the diversion dams would have a maximum storage capacity of approximately 40 acre-feet with a maximum dam height of 50 feet. The two diversion tunnels would be 8 to 9 feet in diameter and would be unlined except where rock conditions require lining for stability.

For both tailings dam sites, flows in excess of the 100-year storm runoff would over-top the diversion dams and the flood water would be stored within the tailings impoundment. The tailings dams have been designed to have sufficient reserve storage capacity at all intermediate operational stages to contain all water in excess of the diversion capacity from a 500-year flood event. An additional 5 feet of dam freeboard has also been included in the size calculation to provide for wave action.

Construction of Stage I of the tailings dam could be initiated during the first construction season after project approval. The first construction activities would be the development of stream diversion structures to permit diversion of water from the construction area during subsequent major construction activities. After completion of the diversions, the entire impoundment area would be cleared and grubbed to remove trees, brush, and debris. Any topsoil present from the impoundment area would be removed and stored for subsequent reclamation programs. Based on preliminary geotechnical and soil surveys of the two potential sites, only the upper Blackbird site has recoverable quantities of topsoil material. This material would be stockpiled on the south slope of Blackbird Creek Valley. This stockpile would be stabilized as necessary to prevent the materials from eroding. Site preparation of the the dam foundation location would include excavation of severely weathered rock and placement of a grout curtain, if necessary, to ensure a positive seepage cutoff beneath the dam core.

Construction of the tailings embankment would require four types of construction materials: core, shell, filter/transition, and slope protection materials. The quantities of these materials needed for each of the two candidate sites and primary sources of these materials are summarized in Table 4-7. Waste rock from the development of new underground workings and rock available by excavation within the confines of the impoundment would provide a readily available source of shell and slope protection material, respectively.

Impervious core material would be excavated from an identified clay source located about 13 miles from the construction area. This site, known as the Forney Site, is located on private land near the confluence of Panther and Porphyry

TABLE 4-7

MATERIALS REQUIRED FOR CONSTRUCTION OF ALTERNATIVE TAILINGS DAMS AND WATER RESERVOIR DAM (CUBIC YARDS)

	Upper Blackbird Creek Tailings Dam	Lower Blackbird Creek Tailings Dam	Upper Blackbird Creek Water Reservoir Dam	Source
Clay-Core	258,333	336,000	143,000	Forney Site
Rockfill-Shell	1,696,296	1,247,000	100,000	Waste rock and quarried
Filter/Transition	76,000	66,000	15,000	Quarried from impoundment site
Talus/Alluvium	544,445	523,000	-	Blackbird Creek talus
Riprap	23,471	24,000	9,000	Talus

Source: Noranda Mining Inc.

Creeks. The material would be removed with conventional heavy-duty excavation equipment, (in accordance with the rules and regulations of the Idaho Surface Mining Act) and hauled to the tailing dam construction area.

Filter/transition material would be produced by processing talus quarried from selected locations along the northern slope of Blackbird Creek Valley as indicated in Figure 4-7. Excavation of the material would be in accordance with the rules and regulations of the Idaho Surface Mining Act. Processing of the talus would include crushing and sizing to achieve a well-graded sand and gravel mixture required for the filter/transition zone of the embankment.

After the first stage of the disposal facility is completed and approved by the Department of Water Resources, tailings slimes from the backfill plant would be pumped as a slurry, containing approximately 20 percent solids, to the tailing impoundment through 4-inch surface lines. The surface lines would have interception structures to contain any accidental spillage. The tailings slurry would be discharged to the impoundment through a distribution line running along the dam and the perimeter of the impoundment. This distribution line would be constructed to permit selective placement of the tailings. Initially the tailings would be deposited along the dam to keep decant water from the dam. Subsequently, the tailings would be deposited in such a manner as to result in a confined decant water pool along one edge of the impoundment. The tailings water and any runoff water reaching the tailings impoundment would be collected in this pond and reclaimed for use at the concentrator. Water would be withdrawn from the tailings pond to the concentrator reclaim tank by means of a decant system. Under normal operation, decant water would be recycled back to the concentrator at a rate of 90 gpm by means of a 4-inch pipeline.

Any seepage of water through the dam would be collected at the toe of the tailings dam and pumped back into the impoundment. Instrumentation to monitor potential seepage from the tailings dam will be determined by the Forest Service and the Idaho Department of Water Resources after evaluating the detailed engineering design for the structure.

Upon completion of operation of the Blackbird Project, the tailings impoundment would be covered with gravel and a clay seal to create a moisture barrier. This barrier would be covered with the top soil stockpiled during construction, and the impoundment area would be revegetated as discussed in the conceptual Reclamation Plan included as Appendix C. To ensure long-term safety of the tailings embankment, an emergency spillway would be incorporated into the dam design as required by the Forest Service. Pipelines, pumps, and other equipment would be removed from the site. Borrow areas of dam construction materials would be reclaimed in compliance with the requirements of the permits for these areas from the Idaho Department of Lands.

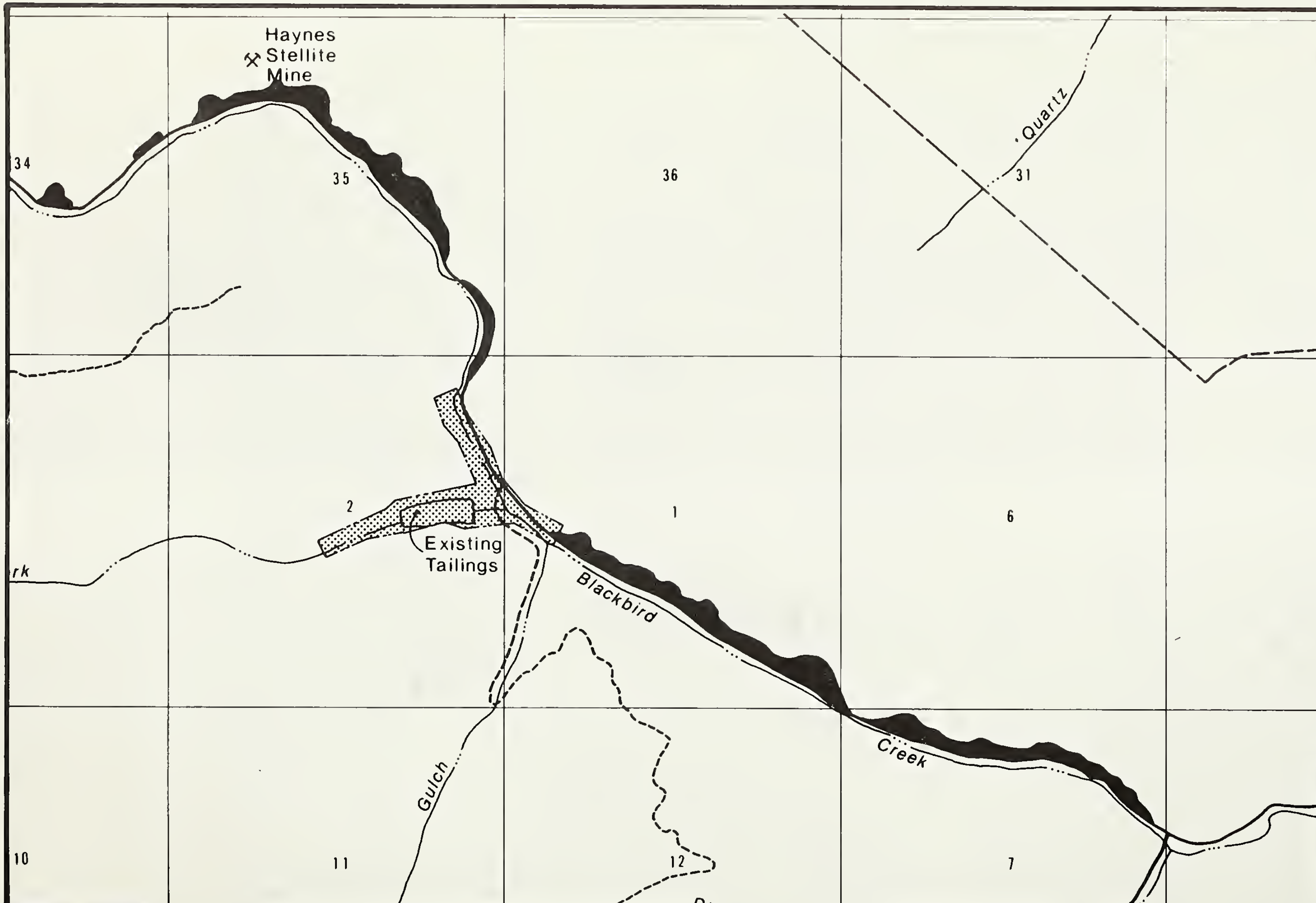


Figure 4-7
Potential Talus Quarries Along Blackbird Creek

Source: Noranda Mining Inc.

4.2.5 Water Supply

The operation of the Blackbird Project would require approximately 300 gallons per minute of fresh water to meet sanitary and domestic water requirements, and to supply make-up water to the expanded concentrator's reclaim water system. The existing water supply reservoir on upper Blackbird Creek does not have sufficient storage volume to meet this water requirement and the reservoir is in poor condition. Consequently, a new water supply must be developed for the project.

Two viable options exist for providing the necessary water requirements for the expanded project operation: a new reservoir on upper Blackbird Creek and pumping water from Panther Creek. Development of a well field was also initially considered, but was eliminated from detailed study because of the lack of suitable groundwater sources in the project area.

The new reservoir would be located immediately upstream of the proposed upper Blackbird Creek tailings impoundment. This location could be used for water supply reservoir independently of the tailings disposal facility location. If the tailings impoundment is also located in upper Blackbird Creek, the water supply reservoir would also function as an integral part of the diversion structure for the tailings impoundment as discussed in Section 4.2.4. If the tailings disposal facility is located at the lower Blackbird Creek site, the reservoir would have a conventional dam spillway structure.

The water supply dam would be a zoned rockfill dam with a positive foundation cut-off like that presented for the tailings embankment. The dam would have a central impervious core with upstream and downstream rock fill shells. Preliminary design considerations for this impoundment are provided in Table 4-6.

The dam would have a crest height of 115 feet and the resulting 18-acre impoundment would have a storage capacity of 550 acre-feet. This volume of water would provide a reliable supply to meet project requirements even during periods of drought.

Construction of the reservoir would include diverting Blackbird Creek; clearing trees, brush, and other debris from the entire impoundment area; and removing and stockpiling any topsoil material present. Topsoil would be stockpiled in Blackbird Creek Valley. This material would be stabilized as necessary to prevent erosion. Embankment construction materials would be from the same sources used for construction of the tailings dam.

The alternative use of Panther Creek as a water supply source would require construction of a stream diversion and pump station on Panther Creek just upstream of the confluence with Blackbird Creek. The concrete diversion structure would be constructed across Panther Creek to form a short pool which would assure a minimum head for pumping. Transition channels would direct the water from the pool to a sump located in the pump house. The inlet of the sump would be protected with trash racks

and 3/8-inch mesh screens to keep larger organisms and debris from entering the sump. The water would be pumped continuously at a rate of 300 gpm by means of two 75 HP pumps placed in parallel. Approach velocities in the transition channels would be kept to less than 0.5 feet per second to reduce potential impingement effects.

To provide a constant head for the distribution system, water from either source would be pumped through a 6-inch pipeline to a 500,000-gallon storage tank to be located in upper Meadow Creek above the new shaft facilities. This storage facility has been sized to provide adequate reserve storage capacity for fire protection.

Upon completion of operation of the Blackbird Project, the water supply reservoir could be left intact depending on the desires of the Forest Service. Pipelines, pumps, diversions, and other unnecessary structures or equipment would be removed from the site.

4.2.6 Transportation and Service Corridors

The expansion of the Blackbird Project would require the transport of additional employees and supplies to the project site and the shipment of concentrates from the site to the refinery. The expansion would also require the construction of a limited amount of new on-site roads and service corridors to permit construction, operation, and maintenance of the new facilities required by this expansion. Since the route and extent of this on-site construction would depend upon the arrangement of the various components into complete development plans, these on-site corridors will be discussed in Section 4.3, Formulation and Description of Alternatives.

Vehicular access to the project area is provided by four existing routes off U.S. Highway 93. These four routes are frequently referenced by the drainage basins they follow and are commonly referred to as the Napias Creek - Williams Creek route, Deep Creek - Williams Creek route, Panther Creek - Salmon River route, and the Morgan Creek route (Figure 1-1). These roads are largely administered by the Forest Service, although portions of the Morgan Creek and Williams Creek roads are controlled by the Bureau of Land Management, and limited stretches of the Napias Creek road are on patented placer mining claims. Also, through cooperative agreements, portions of these routes are maintained with county resources.

The preferred route for both commuter and freight access to the site is over the Deep Creek - Williams Creek route. The Napias Creek - Williams Creek route is the most direct route to Salmon, but the steep grades on the Napias Creek road and the private land ownership of portions of this right-of-way are major disadvantages for this route. The Panther Creek - Salmon River route was initially investigated but dropped from consideration as a major access route because of its greater length and concerns expressed relative to the effects of increased traffic on the Main Salmon River Road. The Morgan Creek route provides good access to Challis; however, since it is expected that most commuters will reside in the Salmon area, the use of the Morgan

Creek route for major access would also require establishing a separate commuter route. Because of the expected costs associated with reconstruction and maintenance of the principal access routes, the establishment of two primary access routes is not presently economically viable.

It is fully expected that most employees will live in or near Salmon. The Cobalt townsite will have Noranda housing available only for single status personnel, and only for 200 persons. Some employees may live in other surrounding communities and commute via the other corridors (Morgan Creek and Panther Creek), but their numbers are expected to be quite small. It is felt that Salmon will provide more of the new housing needs than other communities.

The Deep Creek - Williams Creek route is presently considered a single lane road, but portions are of sufficient width to accommodate two lanes of traffic. The Williams Creek portion is a well maintained, gravel surfaced road with frequently spaced turnouts. The Deep Creek road is a rocky and rough unsurfaced roadway constructed in the late 1960's to provide a logging truck haul route to Salmon. These existing roads would be upgraded to provide safe and efficient travel for the increased commuter and freight traffic that would use this route under the expanded operation. To minimize the total number of trips, Noranda would arrange for commuter bus service or van pools for those employees who live in Salmon, and would transport supplies for the operation, to the maximum extent practical, on the back-haul of the concentrate trucks. The estimated number of one-way trips per day between Salmon and the project site is 45 passenger vehicles (20 per day on weekends), six passenger buses, nine 20-ton concentrate trucks, and two 25-ton supply trucks.

The necessary upgrading of the Deep Creek - Williams Creek route to handle this anticipated traffic would be defined in a road use permit between Noranda, the Forest Service, the Bureau of Land Management, and the county. This agreement would identify the specific requirements and responsibility for needed reconstruction and maintenance including road widening, grading, berm placement, drainage control, signing, and dust control. The details and responsibilities of this agreement are presently being negotiated, but the following measures will be included in the agreement:

- Signing for identification and speed regulation.
- Curve widening and turnout construction as necessary to provide inter-visible sight distance.
- Dust suppressant application on roads adjacent to campgrounds, residences, and other important land use areas.

All necessary new construction will be in accordance with the Forest Service's Best Management Practices for Road Construction to ensure adequate slope stabilization, road drainage, and erosion control.

All supplies would be transported in compliance with Department of Transportation (DOT), Mine Safety and Health Administration (MSHA), Forest Service, and other applicable federal, state, and local agency regulations. Noranda would continue to notify contractors who haul supplies of pertinent regulations and other Forest Service reporting procedures as outlined in Forest Service Manual 2542.6.

4.3 Formulation and Description of Alternatives

This section describes the project alternatives which were defined by grouping the viable project components into complete development plans. Since the proposed project is an expansion of an existing operation and many of the key components of the development such as the mine and concentrator are fixed, the range of technically feasible and viable alternatives is more constrained than that of a totally new development.

The two principal variables in Noranda's proposed expansion of the Blackbird operation are the location of the tailings disposal facility and the water supply source. As discussed in Section 4.2, two viable options have been identified for each of these variables.

Tailings Disposal Options

- Upper Blackbird Creek Tailings Impoundment
- Lower Blackbird Creek Tailings Impoundment

Water Supply Source Options

- Upper Blackbird Creek Reservoir
- Pumping from Panther Creek

The combination of these variables results in four potential complete development plans:

- Upper Blackbird Creek Tailings Disposal Facility - Water Supply Reservoir.
- Upper Blackbird Creek Tailings Disposal Facility - Pumping from Panther Creek.
- Lower Blackbird Creek Tailings Disposal Facility - Water Supply Reservoir.
- Lower Blackbird Creek Tailings Disposal Facility - Pumping from Panther Creek.

4.3.1 Alternatives Eliminated From Detailed Study

The combination of the upper tailings dam location and pumping water from Panther Creek was eliminated from detailed study based on economic and environmental considerations. Locating the tailings impoundment in upper Blackbird Creek without the water supply reservoir to function as a key component of the Blackbird Creek diversion would necessitate the construction of two major diversion dams further upstream and an additional 1/2-mile of open diversion channel. The cost and

environmental impact of this diversion would be equal to or greater than that of the water supply reservoir. In addition, the Panther Creek water supply system would have to be developed resulting in additional costs and impacts.

Although a return to pre-mining water quality can be postulated, the methods of achieving such a goal are either unknown, or economically infeasible at this point in time. For this reason an alternative which displays a course of action and mitigation program resulting in pristine water quality would not be reasonable or feasible and considering it in detail lies outside the scope of this EIS.

It is important to note that strategies to mitigate existing point and non-point sources of pollution in the Blackbird and Bucktail drainages have been pursued since Noranda's initial involvement with the mine property. Because the major point and non-point sources of pollution are on private rather than public lands, these negotiations were conducted between the company, the Environmental Protection Agency, and the Idaho Department of Health and Welfare. The outcome of these negotiations is expressed in the current NPDES permit (covering point sources) and the Compliance Schedule Order (covering non-point sources). In combination, these documents hold Noranda responsible for mine drainage issuing from the underground mine, and for conducting a non-point source study in the Blackbird drainage in order to formulate a mitigation strategy to reduce impacts from these sources.

The Forest Service believes that these measures along with the sealing of the underground mine and the mitigation measures described for facilities on public land are economically and technically sound, that they fully address the existing problems, and that they will result in an improvement in water quality over baseline conditions. In addition, the programs now in place are practical approaches which may result in further improvements of greater magnitude.

4.3.2 Alternatives Considered for Detailed Study

Descriptions of the remaining three viable alternative development plans and the no action alternative are presented below.

4.3.2.1 No Action Alternative. The No Action Alternative would allow Noranda to continue operation at 300 tpd for the duration of their existing pilot operation; however, since Noranda has determined that operation at 300 tpd is not economically feasible and the existing tailings disposal facility would not support an extended operation, the no action alternative is considered a "no mine" alternative. Therefore, under this alternative Noranda would close the mine and terminate any further operation or development of the Blackbird Project. Reclamation of the site would be limited to that required by the Forest Service on public lands. It should be noted that the Forest Service does not have the authority to deny Noranda's Operating

Plan but only to require reasonable modifications. The No Action Alternative is illustrated in Figure 4-8.

4.3.2.2 Alternative 1. Alternative 1 includes the tailings facility and water supply reservoir located in upper Blackbird Creek. This is the alternative proposed by Noranda. The layout of the major project components under this alternative are shown in Figure 4-9. A utility corridor would be established connecting the concentrator, backfill plants, tailings disposal facility, and water supply reservoir. This corridor would contain the tailings slurry lines, reclaim water lines, water supply lines, and power distribution lines as shown in Figure 4-9. A new road would be established around the tailings and water supply reservoirs to provide access for construction and operation of these components. The existing Blackbird Creek road would be upgraded to provide good all-season access to the major project components. Total new disturbance associated with this alternative is summarized in Table 4-8.

4.3.2.3 Alternative 2. Alternative 2 includes the tailings facility located in lower Blackbird Creek and the water supply reservoir in upper Blackbird Creek. The layout of this alternative is shown in Figure 4-10. This alternative would require rerouting approximately 2½ miles of Blackbird Creek Road to the southside of Blackbird Creek Valley along the new tailings impoundment. The remainder of the existing Blackbird Creek road would be upgraded to provide good all-season access to the major project components. A utility corridor would be necessary from the upper backfill plant to the tailings impoundment and from the freshwater reservoir to the water storage tank. This corridor would contain the power distribution lines, reclaim water line, tailings slurry lines, and water supply lines as shown in Figure 4-10. Total new disturbance associated with this alternative is summarized in Table 4-8.

4.3.2.4 Alternative 3. Alternative 3 includes the tailings facility located in lower Blackbird Creek and the water supply pumped from Panther Creek. The layout of this alternative is shown in Figure 4-11. Except for the water supply and distribution pipeline corridor, the corridor and access road requirements for this alternative are similar to that of Alternative 2. This alternative would require a water pipeline corridor from Panther Creek to the water storage tank at the mill complex in upper Meadow Creek. This corridor would include two 6-inch water lines suspended above ground from short piers spaced approximately 20 feet apart. Two booster pump stations would also be required along this line to avoid excessive pump pressures. Each pump station would be equipped with two 75 HP parallel pumps, one being used for standby. Powerlines would be strung to each pump station. Total new disturbance associated with this alternative is summarized in Table 4-8.

Figure 4-8 No Action Alternative With Existing Facilities

Source: Noranda Mining Inc.

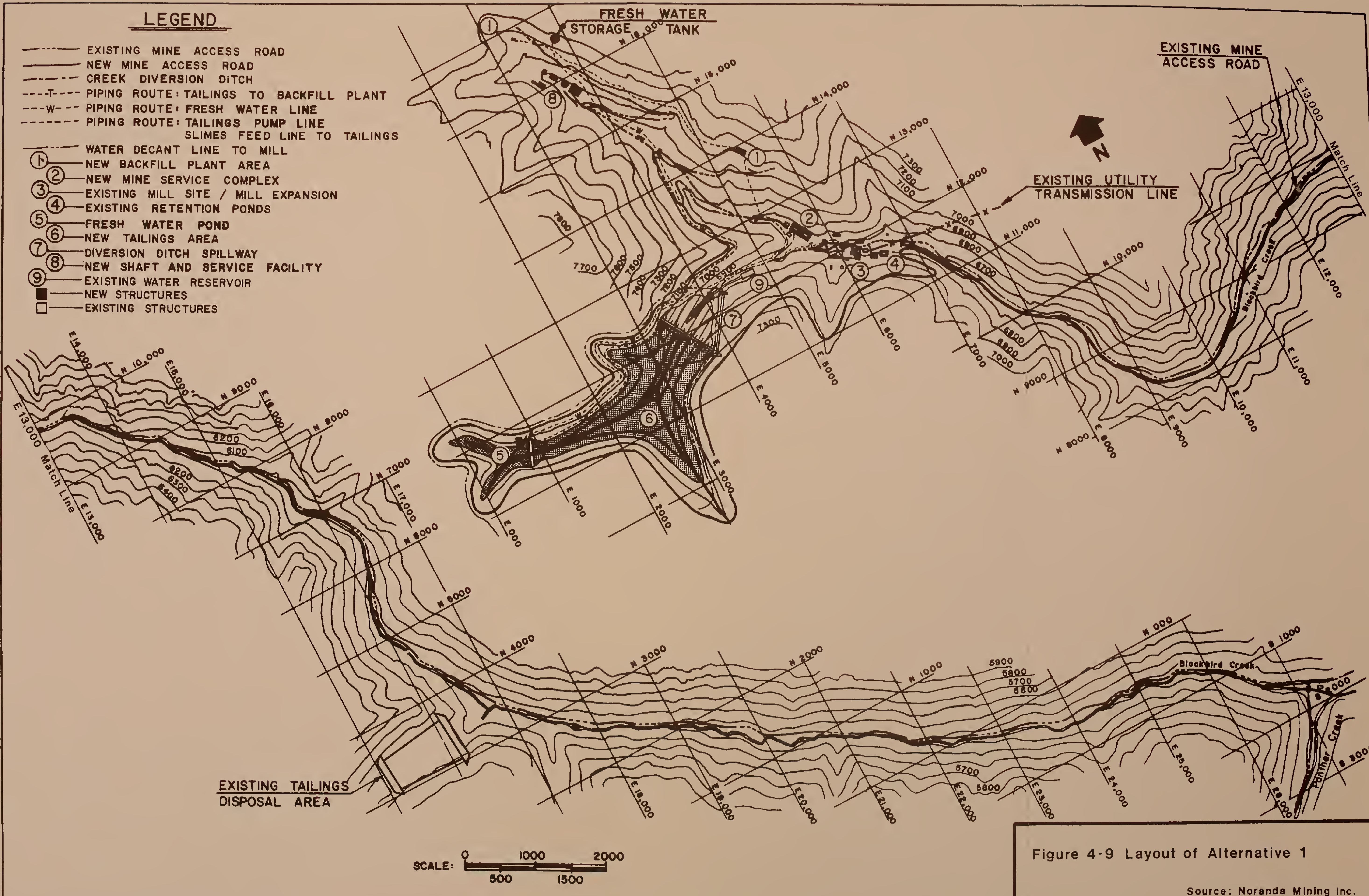


Figure 4-9 Layout of Alternative 1

Source: Noranda Mining Inc.

TABLE 4-8

BLACKBIRD PROJECT ACREAGE DISTURBANCES BY COMPONENT AND ALTERNATIVE

Component	Alternative 1	Alternative 2	Alternative 3
Mill - expansion of mill at 6850'	1.5	1.5	1.5
Mine Service Complex at 6850'	2.0	2.0	2.0
New Shaft and Service Complex at 7400' Portal (includes a backfill plant)	11.1	11.1	11.1
New Backfill Plant at 7250'	0.5	0.5	0.5
Tailings and Water Pipelines to New Shaft and Service Complex, Second Backfill Plant, and Tailings Dam	2.4	4.4	4.2
Tailings Dam at 5500'		169.0	169.0
- at 6900' plus haul road from mill	57.0		
Fresh Water Supply - intake and Pumphouse at Panther Creek			0.2
- Pipeline to Mill			4.4
- Freshwater Reservoir at 7150'	40.0	40.0	
road around Reservoir	6.8	3.3	
Blackbird Creek Road - Relocation of 14,000 feet around tailings dam plus upgrading		13.0	13.0
Powerline Extension - from existing substation at 6850' to pumphouse at Panther Creek, and to New Shaft Facility			1.8
- To Tailings Dam and to New Shaft Facility	1.4	4.2	
Waste Rock Disposal	2.6	2.6	2.6
Contaminated Water Pond above tailings impoundment		2.3	2.3
West Fork Diversion Tunnel		3.3	3.3
Blackbird Diversion Tunnel		3.3	3.3
- channel around Tailings Impoundment for upper Blackbird	1.2		
Total Disturbed Acreages	126.5	260.5	219.2

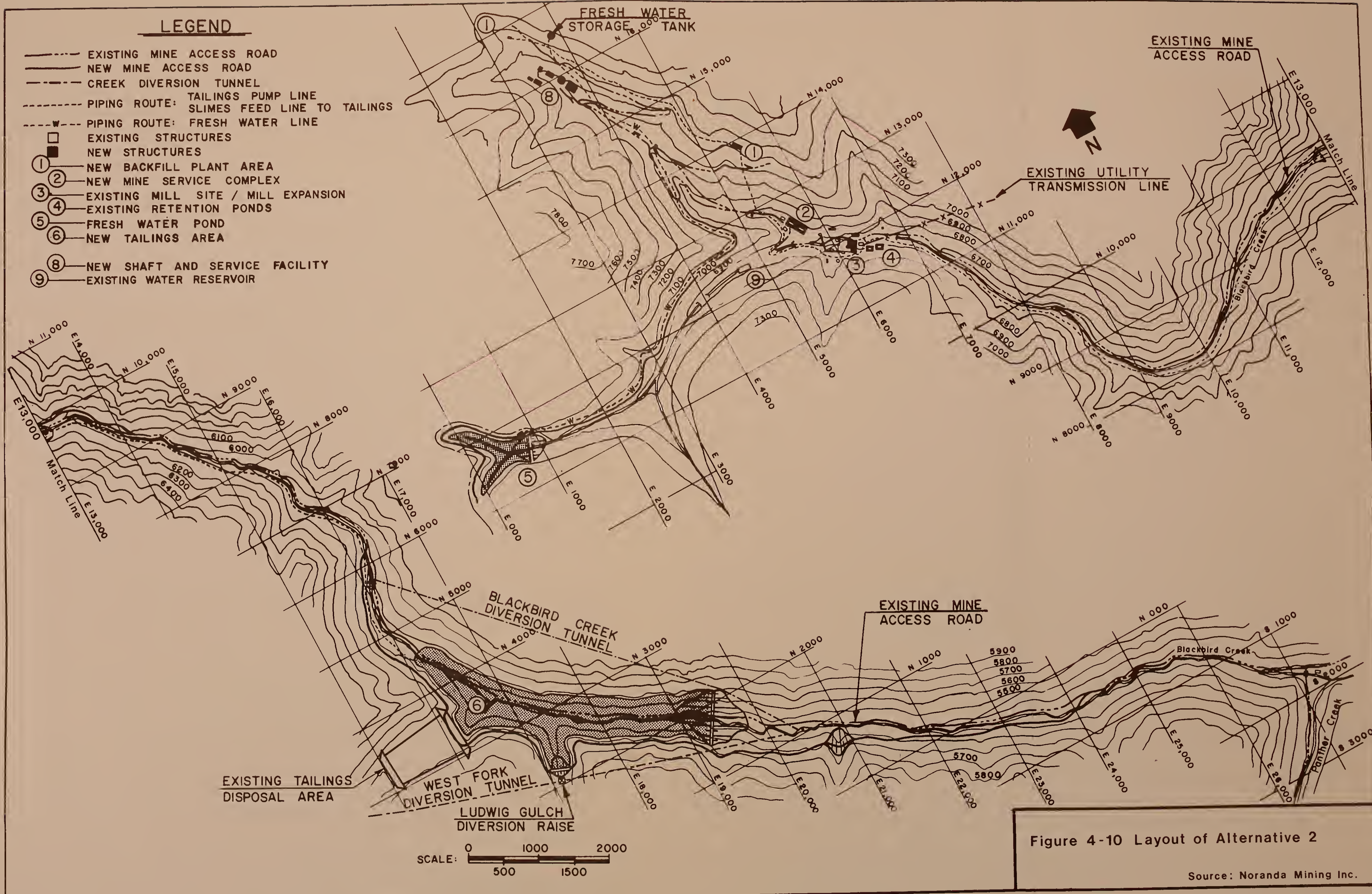


Figure 4-10 Layout of Alternative 2

Source: Noranda Mining Inc.

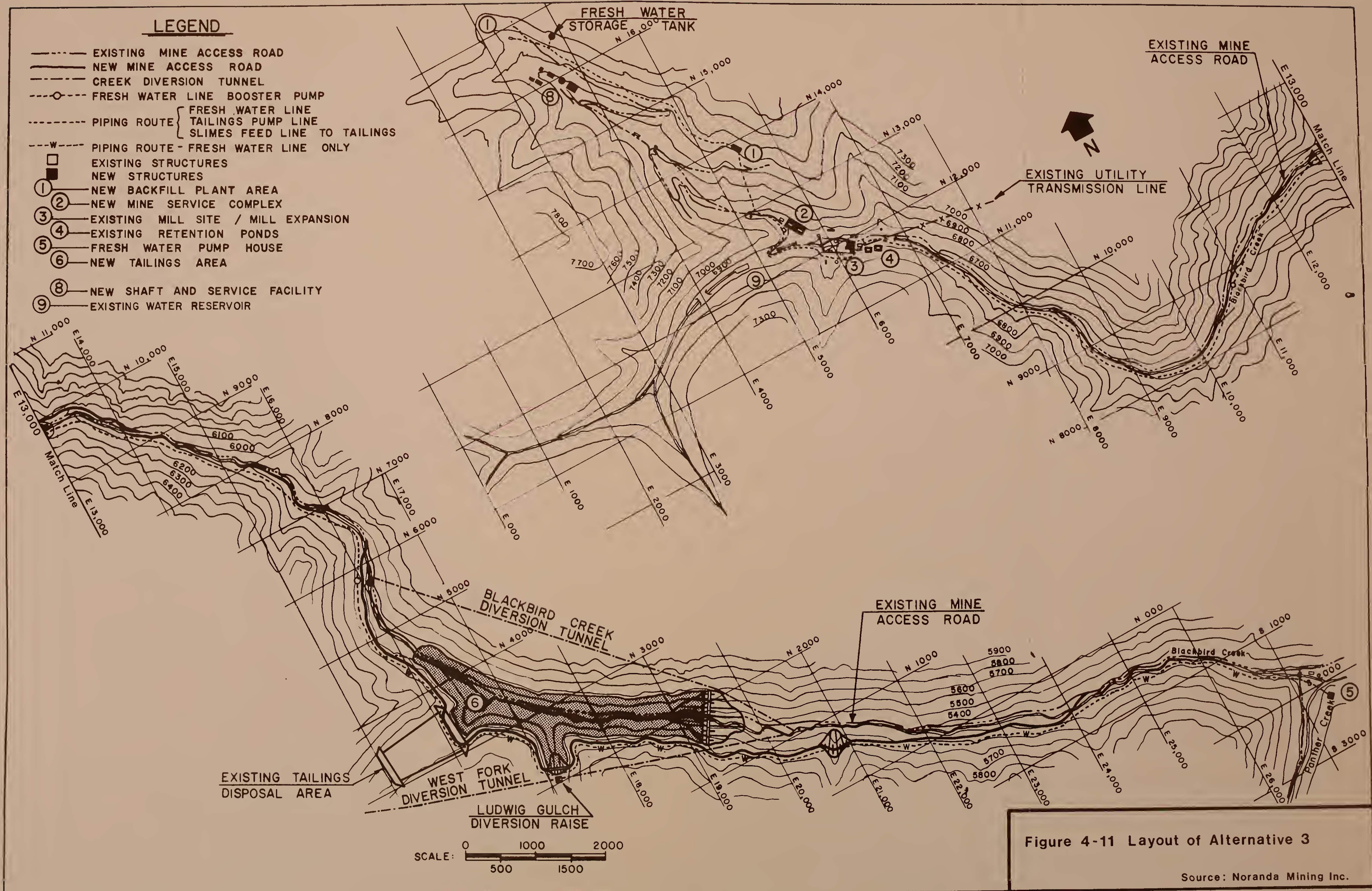


Figure 4-11 Layout of Alternative 3

Source: Noranda Mining Inc.

4.4 Mitigation Measures

Sections 4.2 and 4.3 of this chapter describe the alternatives for the Blackbird Project. The project components were designed using good engineering practices in accordance with relevant federal and state standards. Therefore, certain mitigation measures are inherent in the design of these components. The operation of the Blackbird Project in itself provides certain improvements over the conditions that existed prior to Noranda's operation. The following mitigation measures were developed by Noranda in consultation with the Forest Service and other agencies and have been incorporated into Noranda's Operating Plan and Reclamation Plan.

- Noranda will continue to post notices in conspicuous places informing employees of the laws and regulations governing hunting, fishing, and trapping.
- Topsoil will be stripped from the surface lands to be covered by tailings, water reservoirs, plant sites, or other disturbed areas, and stockpiled. Stockpiled topsoil will be used as a surfacing material for areas where revegetation is proposed in accordance with the Operating Plan.
- If significant pollution hazards occur during construction or operation, stabilization and control measures will be used.
- Noranda will ensure the affected project area is returned to as stable a condition as is practical. The Forest Service will hold a reclamation bond pending the satisfactory completion of reclamation of facilities and disturbed areas on public lands. Facilities on public land requiring reclamation are the mill, tailings pond, and slurry lines, water reservoirs and water pipelines, affected stream channels, non-essential roads and ancillary facilities such as staging-storage areas, pumphouses, and warehouses.
- Surface areas disturbed during construction will be minimized and will be stabilized or revegetated as soon as practical after construction is completed.
- Mass transportation for employees will be available between Salmon, the Cobalt townsite, and the mine. Noranda will support, and encourage the use of, this mass transportation.
- Use of fire will be carefully restricted in the project area by company rules during construction and operation.
- Noranda will use approved spark suppression devices on all equipment and make operators aware of the "hot emissions control device" problem on new vehicles.
- Noranda will cooperate with the Forest Service in the construction of fire lanes or clearing activities when such are determined to be necessary for fire prevention.
- Noranda will restrict access to the office-shop-concentrator complex for public safety and security reasons. Signs will be posted to restrict the public from dangerous areas.
- Noranda assisted in funding the Salmon Growth Management Plan prepared by the Salmon Planning and Zoning Commission in 1980.
- Noranda will give preference to qualified local residents for employment and institute a training program in basic underground mining skills.
- A cooperative road maintenance agreement will be developed between the Forest Service, BLM, Lemhi County, and Noranda for roads on public lands.

This agreement will identify responsibilities for reconstruction and maintenance including minor road widening, grading, berm placement, drainage control, signing, and dust control according to Forest Service standards.

- Noranda will consult with the Forest Service on ways to minimize the visual effects of project facilities in areas visible from Forest Service roads.
- Noranda will continue to cooperate with local government agencies by providing information on any changes in future employment levels when they become available.
- New employees will be encouraged to locate near the City of Salmon.
- A housing assistance program will be developed to aid employees in locating and financing housing.
- Noranda has expressed a willingness to prepay local government taxes as a means of relieving fiscal impacts.
- Noranda has agreed to subsidize for three years (1980-1983) an additional IDFG conservation officer to mitigate indirect effects on wildlife, especially in the lower Panther Creek winter ranges. The Forest Service will continue to cooperate with IDFG to monitor the impacts on critical big game wintering areas in lower Panther Creek and along the Salmon River.

4.5 Management Constraints and Guidelines

The following agency management constraints and guidelines are designed to minimize environmental disturbances during the construction, operation, and abandonment of the Blackbird Project. These requirements are mandated by federal or state laws and associated regulations or guidelines: The agency responsible for enforcing each requirement is indicated in parentheses following each management constraint, according to the abbreviations listed below:

- USFS — Forest Service
- BLM — Bureau of Land Management
- MSHA — Mine Safety and Health Administration
- DOT — Department of Transportation
- EPA — Environmental Protection Agency
- BATF — Department of Treasury, Bureau of Alcohol, Tobacco, and Firemans
- IDHW — Idaho Department of Health and Welfare
- IDWR — Idaho Department of Water Resources
- IDSL — Idaho Department of State Lands
- IDFG — Idaho Department of Fish and Game
- SHPO — Idaho State Historic Preservation Officer

4.5.1 Water Resources

- Accumulated snow from the mine yard will be removed as necessary and stored in order to direct spring runoff into the runoff collection basin or other settling ponds where feasible. (USFS)
- Snow will not be deposited on active waste rock piles or incorporated into earthen structures. (USFS)

- Noranda will control and treat the discharge of pollutants in accordance with the requirements of the NPDES Permit and IDHW Compliance Schedule Order. (EPA, IDHW)
- During construction of the water reservoir and tailings impoundment, the water in Blackbird Creek will be isolated from disturbed areas and settling ponds will be used to treat surface runoff prior to discharge to natural drainages, if necessary. (USFS, IDHW)
- Sediment traps, ponds, berms, and other engineering measures will be used to prevent sedimentation of Meadow Creek and upper Blackbird Creek from construction of new ancillary facilities. (IDHW)
- If water is diverted from Panther Creek, Noranda will cooperate with federal and state agencies to insure instream flow needs are maintained. (USFS, IDFG, IDHW, IDWR)
- All hydraulic structures will be constructed in accordance with flood flow criteria of the Forest Service and IDWR. (USFS, IDWR)
- The runoff collection basin constructed during the pilot operation will be maintained (as specified in the EA) during project operation to provide a settling basin for surface runoff from the mine mill area. (USFS, IDHW)
- Applications to appropriate the public waters of the state must be submitted for any use of water. (IDWR)
- Plans and specifications for construction of any water storage dams or mine tailings impoundment structures must be submitted for review and approval prior to construction. (IDWR, USFS)
- Any work below the mean high water mark on a continuously flowing stream must be approved through the stream channel protection application process. (IDWR)

4.5.2 Wildlife

- If the tailings pond becomes an identified cause of mortality, it will be fenced to prevent access to big game. (USFS)
- Noranda will design and construct telephone lines, electric power lines, distribution lines, and other transmission facilities on public lands in accordance with the guidelines set forth in "Environmental Criteria for Electric Transmission Systems": (U.S. Department of Interior, U.S. Department of Agriculture 1970). Distribution lines will be designed and constructed in accordance with REA Bulletin 61-10, "Powerline Contacts by Eagles and Other Large Birds". (USFS)

4.5.3 Vegetation

- Timber resources on areas to be disturbed will be cut and removed before construction begins. (USFS)
- Areas of disturbance will be minimized during construction and operation. Off-road traffic will be controlled by Forest Service rules and regulations (USFS)

4.5.4 Soils

- Construction locations will be selected to avoid areas with severe erosion or stability problems. If such areas cannot be avoided, construction will be designed to ensure stability. (USFS)

4.5.5 Reclamation and Revegetation

- All quarrying of rock and fill material from private lands for dam construction will be developed and rehabilitated according to a permit for

surface mining and reclamation from the Idaho Department of State Lands. (IDSL)

- All disturbed areas on National Forest land will be reclaimed in accordance with an approved reclamation plan. (USFS, IDSL).

4.5.6 Hazardous Substances

- All hazardous materials including petroleum products, industrial chemicals and other toxic or volatile materials will be stored in durable containers. These materials will be stored in a location that prevents accidental spills from entering watercourses, reservoirs, or groundwater. Storage areas of large volumes (over 500 gallons) of hazardous materials will be surrounded by impermeable containment structures sufficient to contain the maximum possible spill. (USFS, EPA, IDHW)

- Transportation and storage of explosives and hazardous materials will comply with all Forest Service; Bureau of Alcohol, Tobacco, and Firearms; Department of Transporation; and Mine Safety and Health Administration regulations. (USFS, BATF, MSHA, DOT)

- Noranda has developed a Spill Prevention Control and Countermeasures Plan to handle accidental spills of hazardous materials. Spills of chemicals would be handled in accordance with the Idaho Plan for Hazardous Materials Emergency Response. (EPA, IDHW)

- Interception structures will be constructed near tailings pipelines to prevent spilled materials from entering watercourses. (USFS)

4.5.7 Solid Waste

- All waste oil and petroleum products will be disposed of in approved areas. Use of portable chemical toilets is required for construction personnel. No solid waste of any kind can be disposed of in watercourses. (USFS, BLM, IDHW, Lemhi County)

- Garbage will be disposed of in approved sanitary landfills. Other wastes generated during construction and operation will be buried in permitted landfills according to Idaho regulations. Sanitary facilities for solid and liquid waste disposal will comply with all federal, state, and local codes and regulations. (USFS, IDHW, Lemhi County)

4.5.8 Air Quality

- The heavily used mine roads will be treated with a dust suppressant. (MSHA)

4.5.9 Health and Safety

- Noranda will comply with the Federal Mine Safety and Health Act in all mining/milling activities. (MSHA)

- Noranda will continue a training program for employees in basic underground mining skills in order to reduce the potential for injuries. (MSHA)

4.5.10 Recreation

- The Forest Service will post the boundaries and rules of the River of No Return Wilderness Area. (USFS)

- The Forest Service will provide information regarding use of recreational resources in the area. (USFS)

4.5.11 Cultural Resources

- A data recovery program will be implemented if any of the cultural resources identified meet the eligibility criteria for nomination to the National Register of Historic Places. This program will be subject to approval of

the Forest Service, the State Historic Preservation Officer, and the Advisory Council on Historic Preservation. (USFS, SHPO, ACHP)

- Noranda will bring to the attention of the responsible official any cultural resources discovered during construction of the project on Forest Service land. Noranda will delay activities until the Forest Service and the SHPO determine specific mitigation measures. (USFS, SHPO)
- The Forest Service will conduct a survey to locate, identify, and evaluate cultural resources which might be impacted if there is significant surface disturbance involved in reconstruction of travel corridors. (USFS)

4.6 Monitoring Programs

In order to avoid duplication of effort, standarize monitoring techniques, and share available data, the Forest Service will work with other federal and state agencies to develop a monitoring program for the Blackbird Project.

- The Forest Service will continue to monitor the chemical, physical (sediment and discharge), and biological (macroinvertebrates, fish, and periphyton) water quality in Blackbird and Panther Creeks to assess the effects of short-term impacts (spills) and long-term changes. (USFS)
- Noranda will evaluate heavy metals and acidity in Blackbird Creek from nonpoint sources during a three-year monitoring program (1982-1985) in accordance with the stipulations of the IDHW Compliance Schedule Order, Appendix B. (IDHW)
- Noranda will continue the ambient water quality monitoring program on Blackbird Creek and Panther Creek and a biological sampling program (1980-1983) in accordance with the IDHW Compliance Schedule Order, Appendix B. (IDHW)
- Noranda will monitor the water quality of Blackbird Creek according to the requirements of the NPDES Permit. (EPA)
- Groundwater monitoring will be in compliance with requirements of the IDWR Safety of Tailings Impoundments. (IDWR)

4.7 Coordination

As described in the Introduction to the EIS, the Mining Law of 1872 authorizes mining on public land. The Forest Service controls mining activities on public land under its jurisdiction by means of the Operating Plan and a reclamation bond. Forest Service policy requires Noranda to update its Operating Plan to comply with stipulations in the EIS. At this time, Noranda's Operating Plan consists of the project description, preferred alternative, constraints, mitigation measures and the Conceptual Reclamation Plan. The Operating Plan at this time is conceptual in nature. A development schedule will be included in the final Plan. This schedule will allow the Forest Service to allocate the resources necessary to review and monitor activities affecting National Forest lands. As conceptual information contained in the Operating Plan is refined and prior to conducting or allowing any contractor to conduct surface disturbing activities on public land, Noranda will submit detailed design plans to the Forest Service for review and approval. In addition, the Forest Service may require Noranda to update the Operating Plan to prevent adverse

environmental impacts on public lands which were unforeseen at the time the EIS and original Operating Plan were developed.

The reclamation bond required by the Forest Service will be sufficient to reclaim all areas affected by all surface disturbing activities on National Forest land. A bond amount to cover all areas and facilities to be disturbed or constructed during the life of the project could be required, or the bond could be increased on a yearly basis to cover the next season's activities. In any case, the Forest Service will prepare an estimate for reclaiming each facility or area when Noranda submits the detailed plans for review.

5.0 EFFECTS OF IMPLEMENTATION

5.1 Introduction

This chapter of the EIS describes the consequences to the environment that will result should each of the alternatives be implemented. The descriptions will be presented to show differences in the expected output, the costs, and the kinds and amounts of environmental changes resulting from each alternative.

Anticipated environmental effects from implementing the various alternatives have been quantified as much as possible. Certain elements lend themselves to quantification better than others, and for those elements which are difficult to quantify, special effort has been made to provide qualitative statements with sufficient detail to adequately describe differences in significance, magnitude, or duration of the environmental effects. Description is also provided to distinguish which effects are direct, indirect, cumulative, and/or unavoidable. Also included are brief discussions on long and short-term relationships of effects and any resource commitments which are irreversible or irretrievable. Short-term effects are assumed to last for the life of the project; long-term effects will extend beyond abandonment. Certain informal cost/benefit analyses have been made and these are presented as additional background for the record of decision. A summary of the effects of implementation is presented in Table 5-1.

The No Action Alternative is also discussed and compared with the other alternatives in this chapter. It is the intent of this chapter to identify and discuss all major points of view raised by concerned individuals, organizations, and agencies, and relate the effects of implementation to the existing environment as described in Chapter 2. This chapter is organized by discipline (Surface Water, Air Resources, etc) and evaluates the alternatives in each discipline.

5.1.1 Assumptions

A variety of assumptions had to be made in preparing this chapter. The assumptions were necessary to allow quantification of impacts wherever possible in individual discipline areas. Among these assumptions are the following: a finite number of acres was assumed for each of the physical facilities. The construction period for the tailings dam and upgrading of roads and the mill was assumed to be a minimum of one year. The life of the project was assumed to be 15 years. It was assumed the mill would operate 24 hours per day, 7 days per week, and the mine 16 hours per day, 5 days per week. Alternative locations for specific facilities were selected using several geological and topographic criteria plus design criteria from Noranda. These criteria are described in Chapter 4.

Atmospheric emissions from the mill and vehicles were estimated by using standard emission factors. The numbers and kinds of vehicles used on the project were

TABLE 5-1

SUMMARY OF EFFECTS OF IMPLEMENTATION[1]

	No Action	Alternative 1	Alternative 2	Altenative 3
Surface Water				
Operations	0/I/0/L	-/I/Irt/P	-/I/Irt/P	0/I/Irt/P
Abandonment	0/I/0/L	+/I/Irt/L	0/I/Irt/L	0/I/Irt/L
Groundwater				
Operations	0/I/0/L	+/M/0/P	+/M/0/P	+/M/0/P
Abandonment	0/I/0/L	+/M/0/L	+/M/0/L	+/M/0/L
Water Quality				
Operations	0/I/0/L	+/M/0/P	+/M/0/P	+/I/0/P
Abandonment	0/I/0/L	+/I/0/L	+/I/0/L	+/I/0/L
Aquatic Biology				
Operations	0/I/0/L	+/M/0/L	+/M/0/L	+/I/0/L
Abandonment	0/I/0/L	+/I/0/L	+/I/0/L	+/I/0/L
Wildlife				
Operations	0/I/0/L	-/M/Irt/P	-/I/Irt/P	-/I/Irt/P
Abandonment	0/I/0/L	0/I/0/L	0/I/0/L	0/I/0/L
Vegetation	0/I/0/L	-/M/Irt/L	-/I/Irt/L	-/I/Irt/L
Soils	0/I/0/L	-/I/Irt/P	-/I/Irt/P	-/I/Irt/P
Geology & Minerals	0/I/0/L	+/M/Irv/P	+/M/Irv/P	+/M/Irv/P
Air Resources	0/I/0/L	-/I/0/P	-/I/0/P	-/I/0/P
Visual Resources	0/I/0/L	-/I/0/L	-/I/0/L	-/I/0/L
Noise	0/I/0/L	-/I/0/P	-/I/0/P	-/I/0/P
Socioeconomics	-/M/0/L	+/M/0/P	+/M/0/P	+/M/0/P
Cultural Resources	0/I/0/L	+/I/Irt/L	0/I/Irt/L	0/I/0/L

Legend:

Resource
Effect/Significance/Commitment/Duration

Effect:	Significance:	Resource Commitment:	Duration:
+Positive	S - Significant	Irv - Irreversible	L - Longterm, beyond project life span
-Negative	M - Moderate	Irt - Irretrievable	P - Project life, 2-18 years
0 No Effect	I - Insignificant	0 - No Commitment	C - Construction, 1-2 years

[1]When effects are indicated for project life, it is assumed they would not continue long term. When effects are considered long term, it is assumed they would also occur during the project life.

Source: Forest Service and ERT Evaluations

estimated by Noranda engineering staff. The Noranda staff also provided the basic assumptions for liquid effluent disposal, the potential for pipeline leaks and accidents, and safety requirements for reagents and explosives. The actual size the mine was determined by the amount of ore reserves and the expected prices cobalt and copper anticipated by Noranda. Costs for the various alternatives were developed by Noranda.

5.1.2 Expected Outputs

A summary of expected, quantifiable outputs from the various alternatives described is presented below:

- 34,000 tons of cobalt concentrate annually.
- 16,035 tons of copper concentrate annually.
- 466 jobs with an annual payroll of approximately $ 15.3 million (at full employment levels)
- Potential additional revenues from property tax of $39,800 to Lemhi County and $105,400 to School District #291. (Based on 1984 dollars and the 50 percent option under HB 389.)
- Approximately $30,000 in annual sales tax will be received by Lemhi County jurisdictions.
- Lemhi County and School District #291 will also receive additional revenue from net profit on mines tax, based on the taxable income of the mine operation.

These expected outputs will not vary depending on which alternative is chosen, rather, the various alternatives will have different costs incurred to produce these outputs. The differences in cost are discussed in the Cost/Benefit Analysis. These outputs will begin to accrue during the first year of construction, would peak during the first year of production, and would remain relatively constant during the life of the project.

5.1.3 Cost/Benefit Analysis

Any cost/benefit analysis for the Blackbird Project is essentially a cost only comparison of alternatives, because all alternatives are designed to achieve the same goal of cobalt and copper production from the mine. The No Action Alternative would have different benefits than the other alternatives. No formal cost/benefit analysis was performed.

5.1.4 Location Alternatives

The development of location alternatives involved evaluating tailings pond sites, utility corridors, and means of fresh water supply to arrive at a feasible combination

of these elements. Some of the unit costs for evaluating location alternatives for facilities include costs per mile of access road, costs per foot of fresh water pipeline, costs per foot of tailings pipeline, costs per mile of powerlines, costs per site for tailings pond construction, and costs for earthmoving associated with any special construction per site or corridor. Table 5-2 presents the cost comparisons of the project alternatives.

TABLE 5-2

SUMMARY OF NORANDA COSTS FOR PROJECT ALTERNATIVES

Alternative	Relative Initial Capital Cost[1] (000s)	Actual Annual Operating Cost[2] (000s)
1 Tailings at 6900', fresh water reservoir at 7150'	100% of Basic Estimate	$47,000
2 Tailings at 5500', fresh water reservoir at 7150'	124% of Alternative 1	$ 45,000
3 Tailings at 6900', fresh water from Panther Creek	122% of Alternative 1	$ 47,000

[1]Actual cost estimates are not used because of rapidly changing financial conditions and the difficulty in projecting costs several years in advance.

[2]Annual operating costs based on January 1, 1985 dollars.

Source: Noranda Mining Inc.

The No Action Alternative would mean Noranda could continue operations for approximately two years at a rate of ore processing of 300 tpd. Such an operation would produce approximately 110,000 tons of ore annually, with 9,800 tons of cobalt concentrate and 3,100 tons of copper concentrate produced. Existing facilities of the pilot project would be used for these operations. The capital development costs spent on the pilot project are estimated at $40 million.

5.1.5 Federal Management Costs

Expenses incurred by the Forest Service in managing the natural resources of the area after the project is in place are assumed to be essentially the same for all alternatives. The Forest Service might experience minor variations among alternatives in management expenses in areas such as monitoring of the project operations, but such variations would be very minor. The Forest Service anticipates management expenses as a result of having the project in place to be approximately $30,000 annually.

The No Action Alternative would not cause the Forest Service any management expense after the two years of operations. The Forest Service estimates management costs of approximately $10,000 annually for the first two years if the No Action Alternative is chosen.

5.2 Environmental Changes

5.2.1 Surface Water

Effects of project alternatives on the surface water of the study area would consist of: 1) increasing surface runoff in localized areas, 2) construction of facilities in the drainage which would alter the hydrologic regime. In either case, normal drainage patterns would be changed. The single largest effect on surface hydrology would result from construction of the tailings impoundment and water reservoir. The alternative locations are both main-stem locations which would require diversion of Blackbird Creek during construction, operation, and abandonment. Other project activities which could affect runoff include corridor construction, stream channel crossings, and new structures. Effects of increased runoff from construction areas would be small because of their small area relative to the entire watershed. The upgrading of the Deep Creek - Williams Creek Road could potentially affect surface hydrology where the road parallels or crosses a stream. Road construction design would be under the supervision of the Salmon National Forest Engineer, and the effects on surface hydrology are expected to be minor.

No Action Alternative

Implementation of the No Action Alternative would terminate Noranda's activities in the Blackbird Creek drainage. This would allow the area to return to historic conditions, as described previously. An 8-year average annual hydrograph for these conditions is given in Figure 5-1. Transport of tailings and sediment from disturbed areas would continue. Implementation of the No Action Alternative would decrease maintenance activity on the West Fork tailings impoundment, and thus increase the probability that the diversion culvert could plug or fail. If this occurred, the dam would then impound the West Fork drainage without any provisions for handling major flood events, such as an emergency spillway.

Alternative 1

The water supply reservoir would be located immediately upstream of the tailings impoundment on upper Blackbird Creek. It is estimated that operation of the reservoir

Figure 5-1 Average Annual Hydrograph At The Mouth of Blackbird Creek For Project Alternatives (Based on USGS Records 1970-77)

Source: ERT Surface Hydrology Technical Report

for maximum-storage would result in a discharge decrease of 10 percent at the mouth of Blackbird Creek. An annual hydrograph of Blackbird Creek with Alternative 1 in place is shown in Figure 5-1. The reach of stream between the tailings dam and the mill would become ephemeral, except during late spring when overflow would occur four years out of six. The magnitude and duration of this overflow would generally depend on the snowpack's response to meteorological conditions. During overflow periods, the reservoir's hydrologic impact would be temporarily diminished.

The upper tailings dam would be constructed below the water supply reservoir. The major hydrologic impacts of the tailings impoundment would be the loss of surface area (approximately 0.10 mi^2) from the watershed and alteration of the drainage basin. Reducing the surface area of the drainage is not significant. As with any structure which alters the hydrologic regime of a basin, a tailings dam would be subjected to natural forces which would tend to return the stream to its natural gradient. Construction and maintenance of the dam would therefore be performed in accordance with established engineering practice and procedures. The tailings dam will be designed with sufficient safety factors to ensure stability and safety. At abandonment, additional protective measures such as a PMF spillway will be added and the facility will be abandoned in as maintenance-free a state as possible. Maintenance of facilities would still be required after abandonment, but that maintenance would be routine items such as cleaning out trash racks and diversion channels to ensure proper operation of the protective facilities.

Storm runoff above the tailings impoundment would normally be stored in the water supply reservoir. In the event that insufficient capacity existed to contain storm runoff, the excess would be routed into an overflow diversion channel and discharged below the tailings dam. This diversion would be designed to pass a 100-year discharge. In the event that the diversion channel capacity is exceeded, the additional runoff would be allowed to spill into the tailings impoundment. Sufficient capacity would be maintained in the tailings pond to contain a 500-year runoff event. On abandonment, suitable structures would be built according to Forest Service and IDWR standards to direct flood events across the surface of the tailings impoundment. It should be noted that the total volume of the PMF at the upper Blackbird Creek tailings dam site is approximately 600 acre-feet, which is slightly more than the water supply reservoir's capacity.

It is estimated that full mine development to the 6000' level would cause 81 acre-feet of water per year to enter the mine from adjacent watersheds (the mine currently discharges 177 acre-feet) see Groundwater Technical Report. This additional water would be treated and discharged as mine drainage water. Since discharge from the treatment plant is of high quality, the additional 81 acre-feet per year (0.1 cfs) is considered to be hydrologically beneficial. However, the magnitude of this

additional water is not significant compared to peak discharges in Blackbird Creek, but it is a significant fraction (5 percent) of recorded low flows during late summer months.

The Blackbird Creek drainage has been divided into the following component areas for the purpose of erosion analysis: natural forested areas, waste rock disposal areas, talus quarries, main haul road, tailings dam perimeter road, and the general Meadow Creek area. The clay quarry at the Forney site would contribute erosional sediments to Panther Creek. It is estimated that implementation of Alternative 1 would result in increased sediment loading of 1,457 tons/ year for Blackbird Creek and 18 tons for Panther Creek from these areas. This represents an increase of 26% from historic conditions for Blackbird Creek and 0.3% for Panther Creek, or 6,742 tons instead of 5,268 tons historically. It must be emphasized, however, that sediment loading from erosion is not the primary water quality or hydrologic problem in Blackbird Creek. Moreover, the 26% increase represents an average concentration increase of only 100 mg/l above the historic level of 500 mg/l. Part of the sediment loading would be transported as bed load depending on stream velocities and sediment size fractions. It is considered that suspended sediment from erosion due to implementation of Alternative 1 is a relatively minor hydrologic consideration for Blackbird Creek.

There would be seepage through the tailings dam, estimated at 5-10 gallons per minute or 8 to 16 acre feet annually. During operations, the seepage would be collected in a cutoff dam and evaporated or pumped back into the tailings pond. At abandonment, this seepage is expected to gradually diminish as the tailings solidify and naturally dewater through evaporation and seepage. Seepage should cease in 2 to 5 years after abandonment.

<u>Alternative 2</u>

Implementation of Alternative 2 would produce impacts similar to Alternative 1 with respect to the water supply reservoir, except that the perennial reach of upper Blackbird Creek from the dam to the mill area be would increased by 2500 feet.

The tailings dam would be constructed on Blackbird Creek below the West Fork confluence. Hydrologic effects of the tailings dam would be: 1) loss of 0.43 mi^2 of watershed surface area, 2) peak discharge attenuation caused by the diversion dams on West Fork and Ludwig Gulch and 3) alteration of the drainage basin. These impacts are considered negligible to the overall hydrology of the Blackbird Creek drainage. The attenuation of peak flows may be considered a minor benefit. The alteration of the drainage basin will again require maintenance of the facilities following abandonment to ensure stability of tailings dam. Increased mine drainage would be the same as for Alternative 1. Effects from surface disturbances would also be the same as Alternative 1.

Alternative 3

Implementation of Alternative 3 would involve withdrawal of 484 acre-feet of water per year from Panther Creek above its confluence with Blackbird Creek. The average withdrawal rate of 0.67 cfs would have negligible hydrologic effect on Panther Creek. Low flows in Panther Creek at that location are approximately 27 cfs, thus the maximum decrease in discharge is only 3%. The water pumping operation would affect Blackbird Creek by slighly increasing base flows during operations by 0.6 cfs. This is not considered a significant effect.

Considerations for the tailings impoundment are the same as for Alternative 2. Effects from increased mine drainage would be the same as for Alternative 1. Effects from surface disturbances would be smaller in magnitude than Alternatives 1 and 2. The only difference would be the retention of three acres for the water reservoir perimeter road as naturally forested area, which would result in a barely detectable (0.7%) decrease in sediment yield.

Summary

The reduction of flow in Blackbird Creek or Panther Creek by 51 acre-feet annually and the alteration of the drainages would be the primary direct effects of the project. They also represents the cumulative effects of the project as no other new consumptive uses of Blackbird Creek water are anticipated. The flow reduction would be short-term (life of project) and would be reversible following cessation of mining and milling. During operations, the 51 acre-feet per year would be irretrievably lost from the drainage. The facilities would require long-term maintenance following abandonment.

5.2.2 Groundwater

The most significant effect on groundwater from the Blackbird Project is the flow of good quality water into the workings of the mine, reaction with the sulfide ore and oxygen to become acidic, followed by dissolution of iron, copper, and cobalt from the ore, and drainage from the mine to enter surface waters. The operation of the Blackbird Project is viewed as an opportunity to improve groundwater quality and quantity during operations and following abandonment. Mining companies in the past operated without regulations on their waste disposal, acid mine drainage, or measures for abandonment. However, Noranda would have operational and abandonment requirements to meet, which are expected to yield improved conditions in groundwater drainage into surface waters.

No Action Alternative

With implementation of the No Action Alternative, metal loadings from the mine and surface deposits would essentially revert to historic conditions. The mine would again contribute 15,058 pounds of dissolved copper annually to Blackbird Creek, as well as a combined total of 42,542 pounds of cobalt and iron. With subsequent additions from nonpoint sources, these figures would be approximately 70,928 pounds per year of copper, and 76,272 pounds per year of cobalt and iron near the mouth of Blackbird Creek.

The water treatment plant would no longer treat mine drainage, and temporary culverts installed through waste piles would eventually become ineffective without long term maintenance. The diversion of the 7400' portal discharge through the mine workings to the 6850' portal would eliminate acidic recharge to waste piles and non-point sources in Meadow Creek, but increased flow through the mine workings would largely offset these beneficial effects. The improved conditions resulting from Noranda's pilot operation would be lost as well. Flow conditions for the No Action Alternative are shown in Figure 5-1.

Alternative 1

The primary effect of Alternative 1 during operation would be the treatment of all acid mine drainage and the maintenance of diversion culverts around and through previously existing waste piles in the Meadow Creek drainage. The result would be to reduce dissolved copper, cobalt, and iron loadings from the mine as shown in Table 5-3. The increased underground workings are expected to contribute an additional 81 acre-feet per year of mine drainage.

Although 82,300 tons of new waste rock would be deposited on the surface in three various locations, a net decrease in metal loading from all waste rock piles of over 7,000 pounds per year is expected to result. The decrease would be due to revegetation, construction of diversion channels around the new waste rock areas, and diversion of surface flows from several of the existing waste rock disposal areas completed under pilot operations. The net decrease in metals loading will be a short-term effect (project life) unless maintenance of the facilities on private land can be provided following abandonment.

Groundwater effects from the tailings impoundment and water supply reservoir are considered insignificant. Metal loadings to surface waters from seepage from the tailings impoundment would be minimized by impoundment design, favorable reservoir foundation conditions, and by the physical and chemical properties of the tailings to be deposited. Qualitative differences between alternative tailings impoundment sites are due to location with respect to the existing tailings dam, thickness of alluvium at each site, and the possible effects of diversion around the impoundments.

TABLE 5-3

SUMMARY OF ESTIMATED ANNUAL METAL LOADING[1]
(POUNDS/YEAR)

	From Mine Adits		Downstream Stations 4 and 23[2]	
	Co, Cu, & Fe	Cu	Co, Cu, & Fe	Cu
Historic Conditions	57,600	15,058	147,200	70,928
Existing Conditions under Noranda's pilot operation	11,421	5,823	92,621	59,093
No Action Alternative	57,600	15,058	147,200	70,928
Alternatives 1, 2, and 3. Effects are considered similar for all alternatives:				
Full Operation	2,505	157	86,448	55,073
At Abandonment (Flooded to 7400')	~0	~0	144,698	60,018

[1]Does not include unquantified loadings from existing tailings dam which is considered to be insignificant. The table combines discharges into both the Blackbird and Bucktail Creek drainages, and therefore represents the total discharges from the mine.

[2]Station 4 is located on Blackbird Creek immediately above the West Fork confluence. Station 23 is located on Bucktail Creek above its confluence with South Fork of Big Deer Creek.

Source: ESA Groundwater Technical Report

The site conditions for the upper Blackbird Creek tailings dam are very favorable for the construction of a positive cutoff wall under the proposed dam's foundation. Metal loadings due to seepage cannot be realistically quantified but seepage rates are estimated to be less than 10 gpm. Therefore, metal loadings would be insignificant relative to other sources of water quality degradation. For Alternative 1, the West Fork tailings dam would continue to contribute some loading to Blackbird Creek.

At abandonment, it is estimated the mine sealing and flooding would reduce metal loadings from the mine by over 40 percent, and at the mouth of Blackbird Creek by approximately 15 percent of historical conditions (see Table 5-3). The tailings material backfilled into the mine is expected to reduce percolation relative to a non-backfilled mine, and thus reduce the generation of acid mine drainage. It is also anticipated that the cement in the backfill would have a buffering effect that may contribute to improved quality of groundwater.

Alternative 2

The effects on groundwater are essentially the same as for Alternative 1, but there are minor differences expected in certain effects which cannot be quantified. Alternative 2 involves a lower Blackbird Creek tailings impoundment. It would be relatively difficult to install a cutoff well beneath the dam at this location because of increased depth of alluvium. A positive aspect of this location would be the containment of the existing West Fork tailings dam behind the proposed structure. Any seepage from the existing dam would be contained within the new impoundment. With the diversions of West Fork Creek and Ludwig Gulch through tunnels in unlined bedrock, additional metal loading or acid drainage might occur. The possibility of this occurring is dependent upon the fracturing, permeability, and mineralization of the tunneled bedrock. It is not likely that significant loadings of copper and cobalt would occur. The exposure, oxidation, and flushing of iron sulfides is a more likely effect which would increase acidity and iron loading in Blackbird Creek. The maintenance of these facilities following abandonment will be greater than for facilities in Alternative 1.

Alternative 3

Effects of implementing Alternative 3 are similar to those for Alternative 2 No significant groundwater effects are estimated for the proposed diversion of water from Panther Creek.

Summary

The effects described above are all direct effects of the project and no indirect effects on groundwater are expected. The described effects also represent the cumulative effects because no other projects or operations have been identified which could affect area groundwater. Small improvements (40 percent) in metals loadings to Blackbird Creek are expected at abandonment. A reduction in metals loadings from the mine discharges will be a long term effect but non-point discharges of metals will also continue after the life of the project.

5.2.3 Water Quality

During initial interaction between Noranda and federal and state agencies involved in the Blackbird Project, the issue was discussed of returning Blackbird and Panther Creeks to pristine water quality conditions. The agencies decided that returning the study area streams to their natural state was not a precondition for the reopening of the mine. (Aquatic biology effects are discussed in Section 5.2.4)

The operation of the Blackbird Project is viewed as an opportunity to improve water quality in Blackbird and Panther Creeks. In order for Noranda to expand the

Blackbird Project to 1,200 tpd, several facilities and structures would have to be maintained (water treatment plant, surface water diversion culverts) which would serve to decrease the metal loading and increase the pH levels. The relationship between pH and the toxic form of copper was shown in Figure 2-3. It is important that the pH in Blackbird Creek be maintained at as high a level as practical to minimize the percentage of the copper which is in dissolved, or toxic form. The pH of the effluent from the mine water treatment plant is expected to be about 9.0, which at a discharge rate of 300 gpm would theoretically produce a pH of 8.5 at the mouth of Blackbird Creek. This assumes that the effluent at pH 9.0 would be in equilibrium with atmospheric carbon dioxide such that the effluent would have a high bicarbonate buffering capacity capable of neutralizing and precipitating metals from the acid of Meadow Creek.

Recent data collected by the the Forest Service and Noranda (Hennes 1981) revealed that the effluent from the mine water treatment plant has very little buffering capacity, having a total alkalinity of only 10 mg/liter (as $CaCO_3$) at a pH 9.1. Consequently, the pH of Blackbird Creek would not be altered sufficiently to precipitate metals introduced by Meadow Creek. The pH of Blackbird Creek during Nornada's pilot operation will generally remain between 6 and 7 which is similar to historic conditions. Since initiation of the treatment plant, pH at the mouth of Blackbird Creek has ranged from 5.7 to 7.1.

No Action Alternative

The No Action Alternative would allow Noranda to continue operation at a 300 tpd level for a maximum of two years. If the No Action Alternative were implemented, water quality would gradually deteriorate from the improved conditions created by Noranda's pilot operation back to near historical conditions because of the long term effect of non-point discharges of metals and the resumption of uncontrolled mine drainage.

Alternative 1

If Alternative 1 is implemented, the pH in Blackbird Creek would be expected between 6.0 and 7.0 under the continuation of the current water treatment process and Noranda operations. This pH increase over historic levels ranging from 4.8 to 7.2 would serve to slightly reduce copper concentrations in Blackbird Creek with more minor reductions in Panther Creek.

The capacity of the existing 400 gpm treatment plant would be increased to an ultimate capacity of 900 gpm, of which a maximum 783 gpm would be expected to be discharged to Blackbird Creek because normal flows will not reach design capacity. Under Noranda's existing NPDES permit the average monthly discharge limitation on copper is 0.15 mg/liter with a daily maximum of 0.3 mg/l, or 0.6 pounds per day

monthly average and 1.2 lb/d daily maximum. To evaluate the impacts of the proposed expansion it was assumed that the limits of the concentration of copper in the effluent would remain the same but that the loading would increase as a result of increased flow of the effluent to 783 gpm. The copper loading would still be less than conditions prior to Noranda's operation. This would result in an average monthly copper loading of 1.4 pounds per day with a daily maximum of 2.8 pounds of copper for worst-case flow conditions.

At the mouth of Blackbird Creek, 1.4 pounds per day loading of copper from the treatment plant effluent would represent an increase of .020 mg/liter over the pilot operation level of .745 mg/liter during the July and August season, which represents a 25% reduction in loading resulting from Noranda's improvements. The historic concentration of copper at the mouth of Blackbird Creek was .993 mg/liter during July and August. Assuming a minimum dilution ratio of 11 to 1 for Panther Creek to Blackbird Creek flows, the increased copper concentration in Panther Creek would be only .002 mg/liter, or .001 mg/liter with a mean dilution flow of 17 to 1. This means that during the life of the project, the copper concentrations in Panther Creek should be approximately 0.045 mg/l. Adding the mean background concentration of .008 mg/liter of copper in Panther Creek yields a concentration of .053 mg/liter during operation of the project. Consequently, the loading of copper from the treatment plant at full mine capacity would have minimal effects on increased copper in Panther Creek, and relative to historical conditions (.109 mg/l), would represent a decrease. This represents a short-term effect during operations.

At abandonment, backfilling and hydrostatic sealing of the mine would greatly reduce the amount of air circulating through the mine. Flooding the mine and reducing air circulation would greatly reduce oxidation of the sulfidic rocks and generation of acid mine waters. Water would still drain from the mine through a myriad of springs and seeps, but it is expected to be of much better quality than that presently draining from the mine. The water quality is not, however, expected to be as good as that presently leaving the water treatment plant. Therefore, it is estimated that water quality in Blackbird Creek following abandonment, would be improved over historical conditions, but would be of lesser quality than during project operations. Groundwater geologists (ESA Groundwater Technical Report) estimate that copper loadings from the mine to Blackbird Creek following abandonment would be 40 percent less than historical conditions. This would result in a 15 percent reduction at the mouth of Blackbird Creek due to loading from non-point sources.

Increased sedimentation under Alternative 1 would amount to 1,475 tons per year in the Blackbird Creek drainage or a 26 percent increase. However, the sediment loading to Blackbird or to Panther Creek, or to the Salmon River would not be significant.

Vehicular traffic hauling reagents and supplies to the mine would increase the risk of accidents and subsequent spills of toxic materials into Deep Creek, Panther Creek, and Blackbird Creek. Such spills could have major or minor effects on water quality depending on the nature and volume of the spilled materials. In general, the effects would be short-term in nature relative to the toxic effects in Panther Creek.

Any breakdown in the mine site sewage treatment plant could result in the discharge of sewage or sludge into Blackbird Creek. The effect would be to raise the biological and chemical oxygen demand (B.O.D. or C.O.D.) in the streams and to introduce coliform bacteria. This would be a short-term effect.

Increased runoff from new waste rock disposal areas is not expected to be significant. Noranda's operation would add 2.6 acres of new waste rock disposal to the existing 47.5 acres in the Blackbird drainage (see Section 4.2.2). Additionally, the new waste rock areas would have diversion berms to prevent surface runoff from contacting the disposal areas. Although the existing waste rock areas are a major non-point source of metal loading to Blackbird Creek, the new waste rock areas would not contribute any significant new metal loadings during operations. The diversions may lose their effectiveness following abandonment.

The seepage through the tailings dam (8 to 16 acre-feet annually) would not have any effects on water quality because during operations it will be pumped back into the tailings pond. It will be near neutral pH and will contain the heavy metals from the ore. The seepage should cease within two years after abandonment.

Alternative 2

The effects on water quality from implementing Alternative 2 would be essentially the same as for Alternative 1. Some differences would result from use of the lower tailings dam site. The lower tailings impoundment would require the construction of two major diversion tunnels to divert Blackbird Creek, West Fork, and Ludwig Gulch around the impoundment. The tunnels would require massive construction involving significant waste rock removal. The tunneling could intercept sulfidic rocks which could then create additional acid water drainage both in the tunnels and from the waste rock disposal areas. The probability of this occurring is unknown.

At abandonment Blackbird Creek, West Fork, and Ludwig Gulch would be diverted through an open channel across the surface of the tailings impoundment to a spillway discharging to Blackbird Creek below the toe of the dam. Designing and constructing the open channel to accommodate the PMF from all three tributaries would be much more difficult than for the upper tailings dam site and would present a higher risk to long-term water quality than would Alternative 1.

Alternative 3

Alternative 3 would require constructing a low diversion dam across Panther Creek just above its confluence with Blackbird Creek. Water would be pumped from Panther Creek at a rate of 300 gpm. Construction would create some short-term sedimentation in Panther Creek, but this is not considered significant.

The loss of 300 gpm of Panther Creek as dilution flow for Blackbird Creek is not considered significant (it represents 0.3% of Panther Creek flows). However, Blackbird Creek would be flowing at a higher rate than in Alternatives 1 and 2 because process water will not be removed from upper Blackbird Creek. Reduced flows in Panther Creek and increased flows in Blackbird Creek would likely yield slightly higher metal loadings and lower pH in Panther Creek below Blackbird Creek. In general, other impacts from Alternative 3 are similar to Alternatives 1 and 2.

Summary

The improved water quality conditions described for the three alternatives are direct effects of the project and represent the cumulative effects as well. The effects of these alternatives are totally reversible, and short-term (life of project). There would be some long-term improvements in water quality following abandonment, but these would be smaller in magnitude than those during operations.

5.2.4 Aquatic Biology

In general, the types of impacts associated with the proposed alternatives are similar. Since fish, periphyton, and benthic macroinvertebrate communities are essentially nonexistent in lower Blackbird Creek, there would be no adverse impacts from the mining on aquatic resources in this stream. However, limited fisheries and periphyton and benthic macroinvertebrate communities exist in Panther Creek below the confluence with Big Deer Creek. It should be noted that any adverse effects which might occur are negligible compared to the problem which exists from previous mining operations.

Both adverse and beneficial effects would result from the proposed alternatives. Continued metals loading and the potential release of toxic chemicals and the associated detrimental impacts on instream flora and fauna represent the greatest adverse effects due to the synergistic effects of toxic metals and chemicals on aquatic life. (Water quality effects are discussed in Section 5.2.3 and riparian vegetation in Section 5.2.6.) Beneficial effects related to treatment of mine effluents and the reduction of non-point sources would improve water quality in Blackbird Creek and lower Panther Creek. Since present conditions in Blackbird Creek and Panther Creek between the Blackbird Creek and Big Deer Creek confluences exhibit low benthic macroinvertebrate productivity and no fish, beneficial effects should help

improve these groups of organisms. However, the anticipated benefits are not expected to be significant enough to allow the recovery of steelhead or salmon runs in Panther Creek.

No Action Alternative

The effects of sedimentation on aquatic biota would be less for the No Action Alternative than for other alternatives because no new construction would take place. Reduction in vehicular traffic compared to other alternatives would eliminate the risk of accidental spills of toxic chemicals into streams and subsequent adverse impact to the aquatic biota. Fishing pressure on regional streams would be less than for the other alternatives since fewer persons would be brought to the area because of the mine operation. At abandonment, the water treatment plant would be closed and acid mine water would again enter Panther Creek. The aquatic habitat in lower Panther Creek would return to historical conditions and prevent any potential improvement of conditions for reestablishing a salmon or steelhead run in Panther Creek. The No Action Alternative would have a more adverse effect on aquatic organisms than Alternatives 1, 2 and 3.

Alternative 1

Alternative 1 would cause a temporary increase in erosion, which would result in an increase in sediment loading in Panther Creek below its confluence with Blackbird Creek. This effect would indirectly affect the limited aquatic resources in lower Panther Creek and is expected to be moderate and of short duration. Rapid reestablishment of benthic macroinvertebrates and periphyton would occur in the affected area due to the close proximity of "seed stock" located directly upstream from the confluence of Panther Creek and Blackbird Creek. After construction is completed, disturbed areas restabilized, and diversions installed, the increase in sediment loadings associated with construction would decrease and allow the existing fine particulate material to flush out of Panther Creek during the first high water period.

Accidental vehicular spills of toxic materials (such as petroleum products, lime, and sulfuric acid) may enter streams and temporarily adversely affect aquatic biota. The effects of these chemicals on aquatic life and habitats have been well documented and should be short-term due to dilution but with possible long-term effects relative to recovery of aquatic life depending on concentrations and durations of spills. Magnesium chloride is being considered by Noranda as a dust suppressant on roadways. The impact of this chemical on aquatic life if it reaches nearby streams is anticipated to be negligible. A temporary breakdown in the sewage treatment plant could result in the discharge of sewage into Blackbird Creek and Panther Creek. This

situation could affect aquatic organisms in lower Panther Creek depending upon the magnitude of the breakdown and subsequent discharge.

Fishing pressure would increase in the upper Panther Creek drainage because of mine-related human population growth. The Idaho Department of Fish and Game has already started increasing stocking of catchable rainbow trout in upper Panther Creek above its confluence with Blackbird Creek to off-set the increased fishing pressure.

Water quality in Blackbird Creek and lower Panther Creek below its confluence with Blackbird Creek would be essentially unaffected due to the operation of the water treatment plant under worst-case flow conditions. The total dissolved copper loadings of Blackbird Creek would be increased by only 2 percent above Pilot Project levels to a level of .765 mg/l and the copper loadings in Panther Creek would be increased to a level of .053 mg/l. Such changes in copper concentrations are not large enough to change the existing potential for biological productivity in lower Panther Creek. This represents a worst-case analysis and actual operational conditions may be improved.

Some flocculated material (heavy metal complexes) may develop in Blackbird Creek as a result of higher pH treatment plant waters mixing with low pH Blackbird Creek (see Water Quality Technical Report). Some of the flocculated material would tend to settle out in Panther Creek, depending on the flow and pH of the dilution water. Amounts of such flocculated material cannot be estimated. If amounts become significant, they could reduce the potential for increasing the biological productivity of Panther Creek.

The possible effects of permanent mine closure on the aquatic biota would relate to water quality impacts. Successful sealing of the adits would cause the water quality following closure to be improved above historic conditions thus benefiting aquatic biota. Other beneficial effects from abandonment on the aquatic resources in Panther Creek would include a reduction in fishing pressure and possible reductions in sedimentation from non-point sources (disturbed areas). The extent of the reduced sedimentation would depend on revegetation to minimize erosion. Successful diversion of surface runoff around new waste rock areas would also help reduce existing pollution levels.

Alternative 2

Impacts on aquatic resources in Blackbird Creek, Panther Creek, and the Salmon River would be similar to those for Alternative 1. More runoff water would affect the disturbed areas in Alternative 2 than Alternative 1 because the tailings pond would be located lower in the Blackbird Creek valley. More culverts and diversions would be needed which would increase the chances for these installations plugging in the event of a 100-year flood.

Alternative 3

Impacts on aquatic resources in Blackbird Creek, Panther Creek, and the Salmon River would be similar to those for Alternative 1. Operation and abandonment effects would be the same as those discussed under Alternative 2 except for pumping water from Panther Creek. Impingement of organisms on the intake structure of the diversion in Panther Creek under Alternative 3 would not be significant.

Using Panther Creek as the water supply source under this alternative would mean that Blackbird Creek would flow at its normal rate or 5 percent higher than in Alternatives 1 and 2, but Panther Creek would have less volume available to dilute Blackbird Creek waters. This means that Panther Creek below Blackbird Creek would experience slightly higher metal loadings and sedimentation under this alternative. The reduction in flow of Panther Creek is on the order of 2 percent, so these effects are not considered significant.

Summary

The effects on aquatic biota described above are direct effects of the Blackbird Project. They also represent the cumulative effects of the project. Increased sediment loading, increases in heavy metals, and greater fishing pressure would result in short-term effects that are reversible following abandonment. Long-term effects from abandonment include improvement in water quality above historic conditions due to sealing of the mine adits and possible reductions in sedimentation due to revegetation of disturbed areas.

5.2.5 Wildlife

Direct effects on wildlife related to the development of the Blackbird Project are not expected to be serious. This is due primarily to the relatively small acreage disturbed, the homogeneous habitats in the drainage, and the relatively poor quality of these habitats for wildlife. The presence of a Fish & Game Department conservation officer subsidized by Noranda will also minimize indirect effects on big game. Very little understory (shrubs and grasses), which are important for many species of wildlife, occurs in most coniferous habitats. No major big game populations occur in the drainage in summer or winter, and no endangered species are present. Effects are also expected to be slight because much of the Blackbird Creek area has already been disturbed by past mining. The primary effects in the drainage would be on songbirds, small mammals, and a few reptiles and amphibians that would be eliminated in certain habitats by mine construction activities. Road-killed wildlife would be the most serious effect related to road corridors.

Secondary effects would result primarily from an increased population in a relatively remote mountainous area. Effects resulting from the increased population would be an increase in legal and illegal hunting; an increase in unintentional

harrassment from hiking, and off-road vehicle use; and increased road traffic causing more road-killed wildlife. Poaching may be the single most adverse effect to wildlife associated with any remote project. The problem is compounded in areas where shift changes coincide with browsing periods (e.g., dusk and dawn).

Increased illegal hunting in the Blackbird Creek drainage and surrounding region is expected to be heaviest on elk and mule deer. It is the potential increase in illegal hunting on winter range that is of most concern because of vulnerability of these species during this time of the year. Bighorn sheep poaching is of primary concern because of their vulnerability in the winter and the interest hunters have for them. Sheep hunting permits are relatively few in number and the capes and heads can be sold for large amounts of money. Critical winter range exists for mule deer, bighorn sheep, elk, and mountain goats at the junction of the Panther Creek Road and the Salmon River Road. It would be extremely easy for illegal hunting to severely damage these populations during the critical winter period.

Significant increases in legal hunting are also expected, primarily on mule deer, elk, and forest grouse. Such an increase in legal hunting would require additional effort in management of game populations by the Idaho Department of Fish and Game. Short-term reductions in the game populations are expected to occur. The long-term effects on regional populations are extremely difficult to assess. Following abandonment, pressure on game populations should be reduced and the game populations should increase in size.

The primary effects associated with road corridors would be similar regardless of which alternative is selected. The major effect is the potential for vehicle collisions with wildlife and livestock. Although big game (i.e., elk, deer, bighorn sheep) are the species most often reported involved in road kills, many other species of wildlife can also be killed on roadways (e.g., snakes, mice, amphibians, coyotes, birds). However, effects associated with road collisions with wildlife are not expected to be severe because many of these roads are steep and have sharp curves that do not permit high-speed driving.

No Action Alternative

Selection of the No Action Alternative would eliminate the potential for almost all the adverse effects on wildlife described for the various alternatives. The present project-related population and traffic levels would remain for about two years before declining to pre-1980 levels. During that time some secondary effects would continue to occur (poaching and road kills). Following abandonment, effects on wildlife should return to pre-1980 levels.

Alternative 1

Alternative 1 would affect approximately 127 acres in the Blackbird Creek drainage of which only 11 acres have previously been disturbed. Construction would affect about 62 acres of land dominated by lodgepole pine, a habitat which is of low value to most wildlife. The Douglas fir/pinegrass habitat (40 acres) provides low to moderate value wildlife habitat.

The tailings disposal site and fresh water reservoir would impact about 104 acres, most of which is dominated by lodgepole pine habitats. However, the major effect associated with Alternative 1 would be disturbance of riparian habitats along upper Blackbird Creek. This is an important habitat that is very uncommon in the drainage. The adverse impacts on wildlife associated with this activity may be mitigated somewhat by construction of the fresh water reservoir. The reservoir would provide an important wildlife habitat that is rare in the drainage and in the region.

Alternative 2

Alternative 2 would affect approximately 261 acres of which 25 have been previously disturbed. The new tailings disposal site will affect about 169 acres and is the only construction activity that would disturb a relatively large part of the drainage. However, most of this land is very poor wildlife habitat and effects on wildlife should be insignificant. The increased disturbance over Alternative 3 is due to 40 acres for the fresh water reservoir, which would disturb lodgepole pine habitat, which is of limited value to wildlife.

Alternative 3

Alternative 3 would affect approximately 219 acres in the Blackbird Creek drainage, of which 25 acres have been previously disturbed. The effects on wildlife are essentially similar to the effects of Alternative 2.

Summary

The elimination of songbirds, small mammals, and reptiles and amphibians in habitats required for mine facilities would be a direct, cumulative effect resulting in the irretrievable loss of wildlife. However, the loss in wildlife is not expected to be significant due to the poor quality of the habitat and the previous disturbance in the area. An indirect, short-term effect would result from the increased population in this remote area, causing an increase in legal and illegal hunting and road-killed wildlife. These effects are reversible following project abandonment.

5.2.6 Vegetation

The primary effect of construction and operation of the mine/mill complex would be removal of vegetation. Effects associated with vegetation removal include

reduction of wildlife carrying capacity, loss of timber resources, potential loss of candidate threatened and endangered plant species, and increased potential for soil erosion. Impacts on wildlife and soils are discussed in the respective discipline technical reports.

Duration of this resource loss is dependent upon the mining operation life and the rate of forest regeneration. Assuming a 20-year project life and a regeneration time of 50 years for forest species, resource losses would extend for approximately 70 years. A secondary assumption is that adequate reclamation would be possible, and that tree species would be able to grow successfully on reclaimed tailings disposal piles. Reclamation potential is discussed in the Reclamation Plan (Appendix C).

No Action Alternative

Implementation of the No Action Alternative would result in no change in existing vegetation communities.

Alternative 1

An estimated 116 acres of forest land would be removed to implement this alternative. Forest land affected is evaluated as low in productivity (less than 50 cu. ft./acre/year). Estimated total tree basal area is approximately 21,600 ft^2 for this alternative, with greater than 75% of this being provided by lodgepole pine less than 4 in. in diameter. Significance can be assessed by examining the quality and extent of the resource in relation to some standard. Quality of the Blackbird Creek timber resource is generally low (capability Class V and VI) because of poor site conditions and timber losses due to disease. Alternative 1 would remove approximately four percent of the available timber resource in the Blackbird Creek drainage for a period of approximately 70 years. Based on these quality, area, and duration factors, the timber resources loss is considered insignificant. Other indirect effects include a higher risk of fire and off-road traffic in the area.

The very narrow riparian zone along Blackbird Creek for this alternative is only weakly differentiated from surrounding forest communities. The zone immediately adjacent to Blackbird Creek is characterized by a tree overstory consisting of Engelmann Spruce (Picea engelmannii); a shrub stratum consisting of menziesia (Menziesia ferruginea), scattered willows (Salix sp.), wild honeysuckle (Lonicera involucrata; and an herbaceous stratum dominated by bluejoint grass (Calamogrostis canadensis).

An estimated 4,000 linear feet of the riparian zone will be affected by this alternative. Assuming an average riparian zone width of 50 ft, a total of 200,000 ft^2, or 4.6 acres of this community type will be disturbed by implementing this alternative.

Alternative 2

An estimated 232 acres of forest land would be removed to implement this alternative. Forest land productivity characteristics are the same as those described for Alternative 1, and total tree basal area affected is estimated to be 8500 ft^2. The majority of the forest area disturbed would be in the fresh water reservoir area. Alternative 2 would remove approximately two percent of the available timber resource in the Blackbird Creek drainage. This loss is considered insignificant when compared with the resource supply.

The riparian zone along Blackbird Creek included in this alternative is barren due to chronic exposure to acid mine drainage. As a consequence, no riparian zone vegetation acreage can be calculated for this alternative.

Alternative 2 may potentially affect candidate threatened and endangered plant species habitat (south-facing talus slopes) at the tailings pond locations. An estimated 40 acres of this habitat is included within the tailings pond boundary. At this time, no population of a candidate species is known from this site.

Alternative 3

An estimated 191 acres of forest land would be removed to implement Alternative 3. Estimated total basal area removed would be 2670 ft^2, or less than one percent of the available timber resource in the Blackbird Creek drainage. As in Alternative 2, potential habitat for candidate threatened or endangered plants may be disturbed.

Summary

An irreversible and irretrievable commitment of resources could occur if:

1) Excessive soil erosion is allowed to occur on cleared sites;
2) The tailings pond is not adequately reclaimed to the current level of surrounding forest community production.

5.2.7 Soils

Each alternative for the Blackbird Project would have a significant effect on soils in the local area of construction, primarily the tailings disposal impoundment. The effects include compaction, erosion, mass movement, and soil pollution with materials containing sulfides and/or heavy metals. Each alternative would necessitate a long-term maintenance program to control acidity and infertility on revegetated tailings areas. Care must be taken to ensure that acidic materials and acidic drainage do not contaminate surrounding areas. Overall effects of the entire project on the soil resource of the Blackbird watershed would be minimal.

For Alternative 1, the soil materials available on the tailings site are more suited for use as topdressing in reclamation, and the disturbances would be more centralized. One advantage of Alternative 1 is that less new disturbance would occur.

Alternatives 2 and 3 utilize the lower tailings disposal site which contains soils less suitable for reclamation. There may also be some problems with slope stability if the toes of talus slopes are disturbed. There is some evidence of movement and small active slides in the lower Blackbird Creek drainage.

The soils in the Blackbird Project area are moderately susceptible to erosion by water. Thus, unfavorable impacts would be minimized by minimizing the area to be disturbed, by careful control of acid or toxic waste materials, and by prompt stabilization of disturbed areas. This would result in the least soil loss and the least sediment pollution. Erosion control measures include reestablishment of vegetation, mulching, and proper road design. During construction activities, long unbroken slopes would be avoided. Long-term effects would be minimized by revegetating and stabilizing all disturbances after operations cease.

5.2.8 Geology and Mineral Resources

The project will cause significant effects on mineral resources and moderate effects on the geology of the area. These effects can be characterized as topographic modifications, extraction of mineral ores, and effects on the stability of project components related to geologic hazards such as mass movement and earthquake events.

No Action Alternative

Implementation of the No Action Alternative would eliminate the potential for any of the effects described above. Some minor topographic modifications have already occurred, and ore has previously been extracted. These effects are irreversible, but no additional effects would occur.

Alternative 1

The tailings disposal area would fill approximately 60 acres of upper Blackbird Creek to a depth of 80 feet with tailings and the retaining structure. This is an irreversible commitment and would alter the natural configuration and drainage. The diversions and water reservoir would disturb approximately 20 acres. This would create a permanent lake in upper Blackbird Creek but would not effect lower Blackbird flow in the long term. The mine service complex and new shaft facility would be constructed in upper Meadow Creek and would disturb approximately 2.3 acres. This would be a minor change in existing slope shape and localized surface runoff. These effects are irreversible.

Sites for borrow material would include upper Blackbird tailings and fresh water reservoir sites, and areas along Blackbird Creek road. The use of talus material from along Blackbird Creek road will remove approximately 800,000 cubic yards of material and affect approximately 25 acres. This material is broken rock caused by natural weathering of the mountainside and will be replaced by future weathering of the

slopes. The talus removed from impoundment sites will generate no new effects not discussed elsewhere.

Impervious clay materials would come from the Forney site and would involve the removal of 750,000 cubic yards of material and disturb approximately 50 acres. There is a risk of the borrow area slumping, but through proper excavation and reclamation techniques, effects of any slope failures can be minimized. The effects of removing this material are irreversible.

All new road and utility corridors would be constructed in the precambrian metamorphic sediments and are not expected to cause any slope movement problems. The construction will cause minor changes in slope shape and localized drainage patterns. These are irreversible effects.

Approximately 12 pounds of cobalt and 22 pounds of copper will be extracted from each ton of ore mined. The excavation of approximately 7.4 miles of horizontal drift and approximately 8.1 miles of vertical raise will be performed in addition to the existing underground workings. Backfilling the mined areas will prevent any effect of subsidence to the surface area. Under this alternative approximately 82,000 cubic yards of waste rock may be placed in surface dump sites that would occupy approximately 2.6 acres. This material will slightly alter the existing slope shape of the localized area and localized drainage patterns. These effects are irreversible.

Alternative 2

Construction of the tailings dam in lower Blackbird Creek will disturb a somewhat larger area than in Alternative 1. The area will be filled with tailings to a depth of approximately 180 feet and will permanently alter the natural configuration of Blackbird Creek. Diversions will be constructed around the impoundment and these will require stream diversion structures, raises, and tunnels which will alter natural drainage patterns as well.

Borrow areas for talus materials and clay materials will be in the same location as in Alternative 1, but only 538,000 cubic yards of talus, and 479,000 cubic yards of clay will be removed. Road and utility corridors will disturb 75% as much area as in Alternative 1. Other effects are the same as discussed for Alternative 1.

Alternative 3

The effects on geology and mineral resources from Alternative 3 are essentially similar to Alternative 2. Pumping water from Panther Creek will necessitate an extended utility corridor the length of Blackbird Creek (3 miles), but other road and utility corridors would disturb approximately half the area of Alternative 1. Talus material to be borrowed for construction would comprise 523,000 cubic yards, and 336,000 cubic yards of clay would be removed from the Forney site.

Summary

Construction of the tailings impoundment and road and utility corridors would alter the drainage and constitute direct, long-term effects of the Blackbird Project. Removal of talus and clay materials, and the mining of cobalt and copper would result in the irretrievable loss of these resources. By using proper excavation and reclamation techniques, the effects on the topography and stability of the area would be minor.

5.2.9 Air Resources

Air resource impacts from the Blackbird Project would occur primarily as a result of emissions of particulate matter due to fugitive dust and secondarily due to gaseous emissions from diesel powered generators. These emissions are expected to increase the ambient concentrations of pollutants in the atmosphere near the project site, but levels would continue to be well below National and Idaho Ambient Air Quality Standards (AAQS). Therefore, no adverse effects to health or welfare are anticipated. The EPA determined in February 1980 that a PSD permit would not be necessary because emission of pollutants would be less than 250 tons per year.

Air resource impacts would be essentially the same for all three alternatives. Only minor differences in TSP concentration might occur as a result of the road relocation in Alternatives 2 and 3. Fugitive dust generated from mine and mill operations is expected to be negligible because of the moist ore characteristic and the mitigation measures planned by Noranda. Access and haul traffic along the Deep Creek - Williams Creek route is expected to generate significant quantities of dust, especially during the dry months of July, August, and September. The same is true of dam construction traffic hauling materials from the Forney site on Panther Creek. However, impacts are expected to be very localized due to rapid dust settling in the vicinity of the roads. TSP concentrations 1 to 2 miles downwind are expected to be well within Idaho and National AAQS. It is also likely that fugitive dust from these roads would create temporary and very localized reductions in visibility along the roads. The TSP impacts are unavoidable but would be reduced with either dust suppressants or watering during the dry months, depending on details to be determined in the cooperative road agreement.

Gaseous emissions from the four diesel generators are not expected to produce significant impacts. Emissions concentrations from the diesel power plants of particulates, sulfur dioxide, and carbon monoxide will range from 2 to 14 percent of the national and Idaho ambient air quality standards. Combined effects from diesel generator particulates and fugitive dust are not expected to be significant because the generators' plumes are buoyant and will tend to affect elevated terrain, while the fugitive dust is nonbuoyant.

Summary

Cumulative effects from the Blackbird Project with other projects in the region are not expected to be significant. Increased vehicular emissions are not considered significant and would not cause any long-term, irreversible effects on man or vegetation along the access route.

5.2.10 Visual Resources

Implementation of the No Action Alternative would not cause any adverse impacts on the visual resources of the study area. The continuation of a 300 tpd mine/mill operation using the existing facilities would not result in changes in visual quality.

The degree to which the proposed alternatives would adversely affect the visual quality of the study area will be determined by the amount of visual change created by the components of each alternative in relation to the surrounding countryside. Visual change can be measured by comparing the forms, lines, colors, and textures of the alternatives with the corresponding characteristics in the existing environment.

The majority of the people who would view the project area would be associated with the Blackbird Project. Recreationists in the surrounding area, including the River of No Return Wilderness and the Big Horn Crags, will not be able to see the project components due to the intervening ridge lines.

The expansion of the concentrator and waste rock disposal areas and construction of the new mine service complex at the 6850' level would not have a significant effect on the visual resources of the project area. The new shaft and service facility at the 7400' level and the two backfill plants would only be visible within the Blackbird Creek drainage; therefore, the project workforce would be the principal viewers of these facilities.

The dams for the tailings impoundment and fresh water reservoir in upper Blackbird Creek would cause contrasts in color and form with the surrounding area. However, these visual effects would be confined to the drainage and are not significant. The freshwater reservoir itself would enhance the visual quality of the area. The tailings impoundment in lower Blackbird Creek would change the visual quality of the lower Blackbird Creek viewshed. The access road and tailings dam would appear as strong form, line, color, and textural intrusions in the relatively undeveloped lower canyon. The effects on visual quality from the intake of water from Panther Creek, the associated pumphouse, and the pipeline along Blackbird Creek Road are expected to be minor.

The clay quarry at the Forney site will be visible to persons traveling on Panther Creek road. The quarry will modifiy the site topography, lines, and colors in the immediate area (approximately 50 acres). The visual impacts associated with road maintenance and upgrading and increased traffic on the Napias Creek, Deep Creek, and Morgan Creek roads would be insignificant.

Summary

All of the effects on visual quality described above are direct effects. Most of the effects would be unavoidable and would last for the life of the project and beyond, as in the case of road relocations. Many of the visual effects are reversible following removal of the structures and reestablishment of vegetation. The contrasts in color caused by new buildings could be minimized by choosing exterior colors that blend with the surrounding area.

5.2.11 Noise

Noise impacts due to a new project are evaluated by determining the extent that applicable noise standards are exceeded or if the relative change in community noise levels is excessive. In the case of the areas in the vicinity of the proposed project, there are no legal noise standards in existence.

The operation of the mine/concentrator complex and transportation of personnel and materials would be the principal sources of noise for the Blackbird Project. Experience indicates that the environmental noise resulting from a typical large-scale mine/concentrator operation is perceived, at a distance of several miles, as a relatively continuous, low level, low frequency noise. This "effects" distance is significantly less for those directions for which the steepness of the terrain would act as a barrier for sound propagation, which is the case for all directions from the Blackbird Project. Based upon the relatively low levels of noise due to the mine/concentrator complex, the noise barrier effect of the steep surrounding terrain, and the general lack of noise sensitive receptors within 3.5 to 5 miles distance (as noted under baseline conditions), environmental noise impacts of the mine/concentrator complex are not considered significant.

A great majority of the Blackbird Project blasting would be underground and the maximum magnitude of surface blast noise is not expected to create a significant impact. The hauling of materials and concentrate and the transportation of personnel would require 20-ton trucks, 10-ton trucks, and busses. Noise levels from heavy-duty diesel-powered equipment of these types is typically in the 80 to 90 dBA range, at 50 feet reference distance (EPA 1971). At distances of one mile or more, the resulting maximum noise levels due to transportation are predicted to be less than 40 to 50 dBA. With background noise levels in the range of 15 to 45 dBA, the noise from transportation activities would be generally audible to an observer within distances of less than 1 mile.

The construction of the tailings dam at either 5500' or 6900' elevation would significantly increase the noise levels of the area on a short-term basis. The location of both of these dams is several miles from the nearest receptor; therefore, these facilities would cause little or no noise impact. The pumphouse at Panther Creek is not expected to cause an appreciable increase in noise levels. There would

be increased noise associated with the construction of the dam for the freshwater reservoir at the 7150'. level, but this construction noise would be short-term in duration and there are no sensitive receptors in the area. Noise levels would be much lower for the No Action Alternative than for the proposed 1,200 tpd facilities; however, the mining, haul trucks, and surface activity associated with the pilot operation would still be sources of noise.

Summary

The above described noise impacts would be unavoidable, direct impacts from the project and also represent the cumulative noise impacts for the area because no other noise sources are expected to occur. The noise impacts associated with construction of the project components are short-term in duration; the noise impacts associated with operation of the facilities will continue for the life of the project.

5.2.12 Socioeconomics

All of the alternatives for Noranda's Plan of Operation would have very similar impacts on social and economic conditions because employment levels and land use would be essentially the same for each. Therefore, the following discussion details the potential impacts of the overall project without regard to specific alternatives. Identified in this section are the anticipated changes in the study area without the proposed project, the socioeconomic effects of the Blackbird Project, and the cumulative effects of total projected development in the study area. The level of detail provided varies with the significance of the expected effects and the amount of information available, with primary emphasis placed on the total effects of the Blackbird Project at full employment and production levels, anticipated to be reached in 1986, and continuing through the life of the project. It should be noted that in general the population-related effects discussed here are allocated by community to the political jurisdiction involved, e.g. the City of Salmon although it is recognized that a portion of that population will live outside the city limits. This may result in an overstatement of certain growth impacts on the cities of Salmon and Challis versus impacts on county jurisdictions. For the purposes of the financial resources analysis, however, it was assumed that approximately half of the new households would be located within city boundaries, although eventually a portion of the new development in adjacent unincorporated areas will be absorbed into the city by annexation.

Table 5-4 summarizes the anticipated socioeconomic impacts and effects of the Blackbird project, presents mitigation options, and evaluates the relative effectiveness of these options in reducing adverse effects or enhancing the beneficial aspects of the project. Project-induced changes are primarily to be compared with historic conditions, before reopening of the Blackbird operation. For this reason,

TABLE 5-4

NORANDA BLACKBIRD PROJECT SOCIOECONOMIC IMPACT/MITIGATION SUMMARY[1]

Impacts	Mitigation Options	Evaluation
Population Estimates:		
1153 total increase over five years. • 1038 in the Salmon area • 34 in the Challis area • 80 in the Cobalt area	1. Provide private facilities for the construction force in Cobalt.	1. This is a measure which has been proposed by the Company. It will reduce housing and related service impacts on Salmon. A certain number of this approximate 100-person work force will likely live in Salmon and impact community services but the majority are expected to be single and live in Cobalt.
	2. Hire locally to the extent possible and initiate local job training programs.	2. This again is part of Noranda's current plans. The job training program for underground workers is in existence and similar programs for mill and maintenance personnel are being formulated. Local hiring preference and job training will reduce in-migration to the extent possible, reducing related population impacts and concentrating benefits locally.
Employment and Income Estimates:		
• 120-person construction workforce (temporary)	1. As described under "Population".	1. As described under "Population".
• 466-person permanent workforce (mining) • 438-person induced or service workforce (permanent, non-mining) • Approximately 45 percent of permanent jobs will be filled locally	2. The employment and economic impacts described are significant benefits to the community and are themselves mitigation tools. This will be addressed further under "Financial Resources."	2. Project-related employment and income will reduce current unemployment, strengthen and diversify the local economy, and contribute to the community's sense of self-sufficiency.
Approximate Income Figures[2] • $15.3 million annual mine payroll (1984 dollars) (including current employment) • $6.6 million annual service payroll (including current project-related service employment)		

TABLE 5-4 (CONTINUED)

Impacts	Mitigation Options	Evaluation
• $3.0 million annual corporate spending locally (in Lemhi County) of which 40% would be subject to the 3% sales tax. • Assuming 42 % of payroll is disposable income available for local spending and $1.2 million in taxable corporate spending, there would be a potential total of approximately $9.9 million in local annual spending subject to sales tax Lemhi County; and $10.4 million total in the study area.		
<u>Financial Resources</u>		
• The total estimated capital construction cost of the mine and mill facility is $113,900,000 (1984 dollars), which includes such items as the costs of development of additional on-site mine and mill facilities and ancillary facilities such as access roads, utility lines, and other services; payroll; acquisition of land and mining equipment; and working capital. Because a substantial amount of this total is property tax exempt, e.g., environmental control measures such as the tailings dam and other pollution control equipment, while other items are subject to other taxes, such as vehicle license taxes, the amount subject to property taxes is $36,122,000 (1984 dollars). Assuming that the affected taxing jurisdictions (primarily Lemhi County and School District #291) exercise the "50% growth option" allowed under HB 389, the property tax base of Lemhi County would increase by a total of	Although the increases in financial resources are benefits and mitigation tools in themselves there are additional measures which can maximize these benefits: 1. Under HB 389, jurisdictions impacted by large-scale development impacts may elect to waive the 5% annual budget increase limitations placed on taxing jurisdictions by the 1% initiative and instead incorporate 50 % of new construction full market value into the tax base and apply the current mill levy to generate additional tax revenues (not subject to the 5% limitation)	1. Increased Tax Revenues under H.B. 389: The following is an approximation of the tax revenues generated by the project to the extent they can be estimated: • Assuming a taxable property value of $36,122,000 for the mine and associated facilities and selection of the 50% option under HB 389, annual property taxes generated by the new mine and mill facilities would be $39,800 to Lemhi County and $105,400 to School Dist. #291. Comparable figures based on assumed new residential construction would be $3,500, $18,700, and $11,000, for the county, school district, and City of Salmon, respectively, assuming a 50 percent distribution of new housing units within the City and 50 percent to adjacent unincorporated areas. Benefits to Salmon could vary, however, depending on the various housing considerations discussed. - The bonding capacity of School District #291 could increase by $1.06 million.

TABLE 5-4 (CONTINUED)

Impacts	Mitigation Options	Evaluation
$18,061,000 at full production levels, gradually increasing over the life of the project due to additional annual incremental capital investments of approximately $1 million, with corresponding increases in property tax revenues. It should be noted that all property tax projections presented in this analysis are based on current mill levies, and therefore represent only a hypothetical estimate of the actual tax revenues which would be generated given applicable tax exemption statutes, local fiscal policy decisions, and mill levies at the actual time of assessment.	2. Under HB 522 new businesses may propose to prepay a portion of their property taxes (not more than 50% of the total for a 10-year period). This option is very useful in paying for front-end construction costs which are generated in the initial period of development (for example, construction of the new school in Challis). The prepayment process involves creation of a local impact committee at the request of the industrial developer. This committee, which includes representatives of the county commissioners and all affected taxing jurisdictions, negotiates the prepayment agreement and administers the disbursement of the prepaid funds. In this case, the primary taxing jurisdictions involved would be the county and School District #291. There is no statuatory mechanism for allocating a portion of these revenues to jurisdictions such as the City of Salmon which do not share in the industrial tax base. This same restriction applies to the distribution of additional tax revenues generated under the 50% growth option, e.g., the City can only benefit from the increased assessed value resulting from new residential, commercial, and other project-related development within the city limits.	- Annual sales tax revenues would increase by $30,000 to Lemhi county jurisdictions. Based on current distribution percentages, approximately $14,400 of this amount would go to Lemhi County and $13,200 to the City of Salmon. In addition $31,100 would be distributed to school districts statewide. - The net profits on mines taxes generated will vary with market prices and other factors, but are estimated at $15,300 for Lemhi County and $40,400 for School Dist. #291, based on an average annual value of $13,850,000, 1981 mill levies, and the 50% option.
• The net proceeds generated by the project at full production levels were estimated to be $13,850,000 (1984 dollars), based on an average cobalt price of $22.50 per lb. and $1.25 per lb. for copper. The actual net proceeds could vary greatly, however, based on fluctuations in the market price for these commodities, which have ranged from $9.00 to $50.00 per lb. for cobalt and $0.75 to $1.00 per lb. for copper between 1979 and 1981. The amounts generated under the State Mine License Tax, state income tax, and county net profits on mines tax would correspondingly vary, since they are based on net proceeds values.		2. Assuming the project proceeds, Noranda is willing to negotiate a tax prepayment program under the provisions of HB 522. The actual amount of prepayment would be subject to negotiations, and would accrue primarily to Lemhi County and S.D. #291. Given the property tax assumptions stated, the amount generated by the mine and mill facility would be approximately $290,400 per year over a five-year period; of which $79,600 would accrue to Lemhi County and $210,800 to School Dist. #291, for a total of $1,452,000. Any prepaid taxes should be allocated for capital improvements only rather than operating expenses since these prepaid funds represent a "one-time only" allocation rather than a continuing revenue source to operate any new facilities.
• Approximately $9.9 million of expenditures will be subject to local sales taxes, generating a total of $30,000 annually to Lemhi County jurisdictions.		

TABLE 5-4 (CONTINUED)

Impacts	Mitigation Options	Evaluation
• The full market value of new housing in Salmon is difficult to estimate for several reasons: 1) the distribution of new county areas, 2) average housing values at the time of construction and 3) mortgage rates. Therefore, a range of market value increases was estimated based on hypothetical distributions and housing costs given in the Technical Report. If 50% of new housing located in Salmon and 50% in the county, then full market value could increase by $3.2 million and $3.2 million, respectively. If 75% went to Salmon and 25% the county, then it would change by $4.8 million and $1.6 million. The estimated housing mix could also vary considerably depending on market conditions and mortgage rates. Quantification of items such as personal taxes (tax on autos, for example) is beyond the scope of reliable and conservative prediction. In addition there are state taxes which are redistributed to counties on a statewide basis, e.g., the Mine License Tax, which cannot be quantified on a local basis. All dollar figures shown in this section are based on assumptions which could change due to state legislation and/or national economic conditions. These figures represent a "best guess" based on current conditions but any of the figures could be higher or lower depending on the factors cited above.		

TABLE 5-4 (CONTINUED)

Impacts	Mitigation Options	Evaluation
Land Use		
The increased population and housing needs will likely accelerate the trend toward urban expansion into the surrounding area, particularly in the vicinity of Salmon. This kind of situation has several effects: a. It affects the agricultural base, particularly if the assessed value of farm land is driven upward by encroaching urban development b. Locations for housing may be ill suited for that purpose, i.e., high water table, saline or clay soils. c. Unplanned growth typically results in a haphazard pattern of houses, mobile homes, businesses interspersed with agricultural land. This type of development is inefficient and costly in terms of access and provision of utility services, and fire and police protection.	1. The City and County can work with the USDA Soil Conservation Service toward establishing the local area as a high priority for soil mapping on which to base planning efforts	1. This has been identified as a need by the City Planning and Zoning Commission. Such information would not only be useful in a planning effort but also in helping private developers and potential homeowners in selecting the best sites for housing or other construction.
	2. At the time the decision is made to proceed with the project, the city and county could consider jointly hiring a planner, preferably someone with previous experience with rapid growth in rural areas and a thorough understanding of community, agency and company concerns and constraints, to provide expertise in planning and securing funds. Maintenance of contact with regional and local officials and planners who have recent experienced similar types of growth is also recommended for exchange of ideas and information on additional sources of technical and/or financial assistance. Financing could come from tax revenues and/or joint company city-county funding.	2. The advantages of this approach is provision of a full-time, trained, and accountable person to direct planning efforts. The disadvantages is the cost involved and allocation of these costs between jurisdictions.
	3. The city and county could jointly adapt comprehensive zoning ordinances to control growth, particularly in unincorporated areas adjacent to the existing city limits. Particular attention should be given to mobile home park standards.	3. Planning and zoning can be used as an effective and necessary tool in guiding large-scale, rapid growth. It can be tailored to meet community needs. Disadvantages include some people's perception that it is a limit on free enterprise and individual rights. Noranda states it will comply with zoning decisions and has assisted the planning effort by contributing $20,000 to the Salmon Planning and Zoning Commission.
	4. The BLM and Forest Service can assist the city and/or county through land exchange or sale processes.	4. The Forest Service has the authority to exchange and the BLM can actually sell or exchange lands for community expansion. Both agencies must identify these lands through formal planning processes which are now in progress.
	5. The City can direct growth through the extension of city utilities to only those areas where their provision is economical and practical.	5. This approach combined with zoning provides the most effective means of directing growth into the most suitable areas.

TABLE 5-4 (CONTINUED)

Impacts	Mitigation Options	Evaluation
Housing		
• Total housing needs at full employment levels would be 383 units. • 329 units would be required in the Salmon area, of which 102 could be supplied by the existing vacancies and planned construction. The remaining 227 units would be a mix of mobile homes, single-family houses and rentals. • 54 housing units would be needed elsewhere, i.e., Cobalt and Challis		Factors associated with providing housing for large projects include: • The short time period for construction • Problems in finance and construction • Lack of space and suitable building sites (physical and/or legal constraints) • Affordability of units • Availability of the necessary utilities Taking into consideration Salmon's size relative to the anticipated growth, it appears that the main considerations are: provision of financing, the affordability of the units, and where the new growth should be channelled.
	1. Noranda could buy land and finance the construction of housing and.or utilities needed for their employees. 2. Noranda could assist employees in locating and financing housings via: -Direct loans -Loan guarantees -Technical and financial advice	1. Provided it was economically feasible, this option could minimize impacts to the community and guarantee that the housing would be available in a timely manner. Our analysis indicates that the private sector is capable of providing the needed housing and that the community can provide the needed utilities, given current capital improvement plans. 2. Given Salmon's lending, construction and utility capacity, this alternative seems a more balanced approach to this issue, with assistance provided where it is most needed, i.e., in the financing of the housing.
Health Care		
Existing facilities are adequate to handle increased demand, but at full employment levels the Salmon/Lemhi-County area will need three additional doctors, one of which would be due to project-related increases.	1. The increase in employment and population coupled with the fact that most of the mine workforce will have health benefit programs available will likely provide the needed incentive to bring doctors to the area.	1. It is assumed that the induced or service-related population increase associated with the mine will include physicians and other health care personnel.

TABLE 5-4 (CONTINUED)

Impacts	Mitigation Options	Evaluation
	2. The community, with assistance from Noranda, could provide incentives such as office or clinic facilities space if a shortage does develop.	2. Such an option would likely be needed if hospital or office facilities were in very short supply or if the number of physicians was very limited.
Social Services		
The project impact will likely decrease the need for such services in the operational period due to increased employment, but it may increase mental health caseloads, particularly as project employment declines during the phasedown period. Eventually conditions will revert to existing levels.	None required during full production; employment counseling and placement services could be provided as employment declines during phasedown.	Our analysis indicates that social services should continue to be adequate through the full production period, with some increased demand anticipated as employment declines.
Law Enforcement		
Both Salmon and Lemhi County are currently within planning standards in terms of patrol cars and officers. Non-project related increases in population would create a need for one additional officer at the county level and two officers at the city level, along with an additional patrol car. Project-related needs would be two new officers and one patrol car in Salmon, for a total annual project-related cost of $36,500 (1981 dollars).	1. A portion of city and county needs could be financed out of increased property and salary tax revenues. 2. A city/county cooperative plan could be worked out benefitting both jurisdictions (see pg. 38 of the Lemhi County Comprehensive Plan) 3. Noranda could provide funding for one officer either for the city or on a joint city-county basis.	1. Increased property and sales tax revenues to Salmon could vary widely, but would help to pay for additional needs. Assuming that 50% of new housing locates in the city, then estimated project-related property and sales taxes would be about $24,200 annually. 2. Such an arrangement could result in more efficient service and may be a way to assist the City of Salmon which will experience most of the project-related impacts while receiving a smaller share of increased tax revenues. 3. This option would allow hiring of a new officer when the immigrating population arrives but before the full operational tax base develops.
Fire Protection		
The largest increase in population and housing units will be in Salmon and surrounding areas, but current fire protection services and equipment are adequate to handle project-related impacts.	None required.	Our analysis shows that even with the project's impact Salmon will have a 1,000 gpd pumping capacity over and above accepted planning standards. We also find that a volunteer force is considered adequate for city fire departments serving a population of less than 10,000.

TABLE 5-4 (CONTINUED)

Impacts	Mitigation Options	Evaluation
Utilities		
Electricity, telephone, and waste disposal facilities will be impacted by the increased population and housing requirements.	Increased tax revenues is a mitigation tool which could be used to offset impacts on waste disposal facilities and partially fund expansion of facilities as required by the Resource Conservation and Recovery Act (RCRA).	Our analysis shows that the impact on electrical service in Lemhi County is expected to be minimal since adequate surplus capacity exists. Service to the mine would be interrupted in the case of a short-term outage under the Idaho Public Utilities Commission curtailment policy. Telephone service is currently being upgraded in Salmon and will at least maintain existing service levels when peak project population impact occurs. Under current planning related to the Resource Conservation and Recovery Act, 1 sanitary landfill and 7 modified landfills are called for in Lemhi County even without the project. Provision of these facilities would be adequate to handle both project-related and baseline growth.
Schools		
Approximately 198 additional students are expected in School Dist. #291 at full employment levels. In Grades K-3, the district is slightly over capacity now, and the project will contribute 69 additional students. Project-related students will bring employment levels up to facility capacity at the intermediate (Grades 4-5), junior high (Grades 6-8), and high school levels (Grades 9-12). Capacity information was provided by former School Superintendent Cook. Current School Superintendent Smith recently provided his capacity estimates which generally concur that four new classrooms and as many as eight teachers will be needed. The district has several options for providing classroom space. The least costly short-term option, which is currently being employed, is the use of modular units. Maximum estimated annual costs would therefore be approximately $162,000 (1981 dollars) (Smith 1981)	1. Expansion of existing facilities and staffing could be financed by additional tax revenues, including prepayment of property taxes for expansion of existing facilities, and other tax sources, such as the School Impact Tax Fund, for staffing. 2. Double sessions could be used as a short-term mitigation option 3. Expansion of facilities and staff could be financed by school bonds 4. All of the above instruments could be used to finance needed improvements.	1. Projected annual property taxes to School Dist. #291 could yield approximately $164,400. Whether or not this amount could finance classroom and staffing needs depends on the extent of improvements sought by the district and the results of prepayment negotiations. 2. This option is generally recommended as an interim measure only, until adequate facilities and staffing for full-day sessions can be provided. 3. Based on the expected increase in tax base, the district's bonding capacity could rise by approximately $1.06 million. However, the district already has considerable indebtedness and may not desire to choose this option. 4. The optimum mix of the mitigation tools available will depend on the methods selected by the District and county to meet the expected enrollment increases.

TABLE 5-4 (CONTINUED)

Impacts	Mitigation Options	Evaluation
Recreation		
The additional population should not have a major impact on outdoor developed and dispersed recreation resources. Input received at recent town meetings indicates a need for youth-oriented recreation programs.	1. Strengthen existing recreation programs 2. The city and county could evaluate possible ways additional recreation could be provided, such as upgrading the swimming pool, indoor ice skating, roller skating rink, or provision of additional park facilities. Noranda could assist in this process and tax-prepayment would be a possible source of funds for the county.	1. Noranda has supported the local team sports such as baseball, football, as well as the bowling league, golf, and KSRA sports broadcast. 2. This kind of program would be most responsive to the community's desire to provide recreation opportunities for its young people.
Transportation		
Project-related traffic is summarized below: • Morgan Creek Road to Challis: 41% increase, to 71 ADT (average daily traffic). • Panther Creek to Deep Creek Road: 49% increase, to 115 ADT. • Deep Creek to Williams Creek Summit: 135% increase, to 66 ADT. • Williams Creek Route: 31% increase, to 160 ADT. • Traffic counts for existing use on Highway 93, and Highway 29 range widely from several hundred ADT to several thousand near the city of Salmon. • The probability of additional traffic accidents with personal injury was calculated at less than one annually. • The probable spill frequency over a 12-year mine life was calculated to be 0.025, 0.027, and 4.9, for sulphuric acid, reagents, and ore concentrates, respectively.	1. Upgrade routes to handle additional traffic 2. Increase maintenance on routes to prevent deterioration of road ways. 3. On mine property Norada should have materials and procedures on hand to handle accidental spills. This would apply to equipment owned and operated by the company 4. Noranda could cooperate with Federal, State, or local authorities on spills of materials en route to or from the mine but not occurring on company property or involving company vehicles 5. The Forest Service could cooperate with Noranda in containing spills. 6. Noranda could make its ambulance and emergency personnel available for accidents involving personal injury on forest roads.	1. The routes likely to require upgrading due to the mining traffic are the Panther Creek and Deep Creek roads. This would be accomplished to Forest Service (FS) standards 2. Maintenance responsibilities on FS roads would be spelled out in an approved road use agreement. County roads and highways are maintained using state funds, in general from the gasoline tax and highway user fees. 3. Noranda does have an approved spill plan and the necessary materials on hand. 4. Although not legally responsible for spills by its contractors or subcontractors, the company has indicated it would cooperate with the Forest Service in these cases on FS roads. 5. The Forest Service will continue to cooperate with the company in handling spills on public lands 6. For accidents involving serious personal injury on Forest roads Noranda has expressed its willingness to make its ambulance and emergency personnel available in cases which occur relatively close to the mine and where employee safety would not be jeopardized.

TABLE 5-4 (CONTINUED)

Impacts	Mitigation Options	Evaluation
• Traffic in and around Salmon can be expected to increase in the same proportion as the expected increase in population (approximately 15 percent). • With roadway improvements being considered by Noranda, the county and USFS, all roadways should be able to handle additional vehicle loadings.	7. Traffic congestion in Salmon could require additional traffic control devices. 8. Mass transportation should be used to the extent possible.	7. Project-related traffic is expected to aggravate existing traffic congestion and parking problems to a slight degree. A detailed analysis of existing traffic patterns, origin-destinations, and facility capacities in Salmon is needed before improvements are undertaken. 8. Noranda's plans are to use busses or vans to transport employees to and from the mine. This will serve to reduce impacts across the board relative to safety, maintenance, congestion etc.
<u>Water</u>		
The project-related increase in water use is 0.2 mgd and is expected to impact the city of Salmon. The existing system capacity is approximately 6.5 mgd (inflow and storage). The current delivery system is inadequate. There is no significant capital investment needed due to the project's impact alone.	1. Existing delivery system could be upgraded 2. Salmon could consider metering to adequately finance and maintain the system 3. The city can control hookup fees to regulate use and finance the system 4. The city could zone to control density or require developers to provide separate water systems in some areas which could not be economically served by city facilities	1. This upgrading of line size is currently under consideration 2-3. These types of measures would place the burden of financing system maintenance and expansion on the developers and homeowners-users. 4. This could be effective in areas which because of distance or elevation would be costly to serve from the existing system.
<u>Sewer</u>		
The increased population would generate an additional 0.2 mgd impact on the sewage treatment system. The existing system is inadequate to meet present needs. According to Ellsworth Engineering, the additional project-related 0.2 mgd would not significantly affect the design or cost of the new facilities currently being planned. Because water quality standards are being exceeded at the present time the possibility exists that the state could limit the number of new hookups made to the city system.	1. See Items 1 and 3 under water.	1. By managing hookup fees the developers-users would bear the costs of maintenance and expansion of the system. As noted under water there are some locations in the city where extending sewer service would be costly due to elevation, distance, or condition of the existing system. Through zoning ordinances or hookup fees the city could guide such growth.

TABLE 5-4 (CONTINUED)

Impacts	Mitigation Options	Evaluation
	2. Grant programs on the state and federal level may be available to assist in financing expansion of the existing lagoon system and main trunk collector lines.	2. The status of these programs is changing at the present time. These changes may affect Salmon's priority listing as well as the cost sharing percentage, source, and amount of funds received. The Forest Service recommends close coordination between city and state administrators to track recent changes in federal and state budgets and programs.
	3. Community Block Grant funds may be available to assist in financing upgrading of the sewer collection system.	3. As decribed under Item 2 this program will likely be affected by recent changes in federal and state budgets and programs. Closs city-state coordination is needed to maximize possible use of this program.
	4. Noranda could assist the city by providing technical expertise in this area.	4. If short-term needs for sewer service develops prior to receiving government assistance, this approach could benefit the company and the city.
<u>Mine Closure</u> The project will likely be phased down over a period of years, decreasing tax revenue, population, employment, and income to pre-project levels. The most significant adverse effects of this closure would occur to the business and housing sectors as well as to any public or private entity which had debts outstanding which were incurred to finance project-related needs in goods or services. It should be noticed that the 1950, 1960, and 1970 census figures show growth in Lemhi County despite the previous mine shutdown in the late 1950's. We cannot assume however, that conditions will be similar in the period when the current operation would close (Year 2000).	1. Utilize tax prepayment to reduce long-term debt on county-school district facilities.	1. By utilizing tax prepayment any necessary expansion of school facilities could be financed prior to mine closure. Other project-related improvements in city-county services are either minor, or primarily in terms of personnel (law enforcement for example)
	2. In the housing sector use mobile homes to minimize unused housing at project end.	2. Mobile homes are typically more affordable then conventional housing and can be moved for sale in other areas.
	3. Noranda could underwrite the risk on short term housing loans.	3. It seems likely that if short term loans are necessary (15-year mine life) government or company assistance will be required.

TABLE 5-4 (CONTINUED)

Impacts	Mitigation Options	Evaluation
	4. Noranda and the city-county could cooperate to implement the development strategies outlined in existing studies by ECIPDA and the Lemhi Development Corp.	4. Implementing on-going plans to develop tourism, recreation, retirement oppportunities or light industry would diversify Salmon's economic base and reduce the adverse impacts of mine closure on the local economy.
	5. The company would assist its employees in finding the jobs within the Norada system and the industry if openings exist.	5-6. Company relocation and state-federal retraining could reduce impacts on person who would be unemployed due to mine phasedown.
	6. There are existing retraining programs, primarily through federal and state agencies and private Industry Councils such as currently in use in the Kellogg Area)	

[1]All assumptions on which the impact projections presented are based are documented in the Socioeconomic Technical Report and Addendum.

[2]Aggretate totals shown may vary from the text due to rounding.

the impacts addressed generally represent a maximum case, i.e., the total change over pre-project conditions, including effects that have already occurred plus the incremental effects of continued mine development. An exception to this is that portion of the financial resources analysis which deals with property and corporate sales tax revenues generated by the mine and mill facilities not yet built and the net profits on mines tax assessed against the annual value of net proceeds associated with mine production. Approximately 100 persons of the total 466 person workforce are already employed; however, the impacts of the remaining 366 employees would be proportionately greater because the majority of these would be in-migrating since the present workforce consists mainly of persons hired locally. Following this approach, decommissioning impacts would theoretically represent a return to pre-project conditions, although it is more realistic to assume that a portion of the project-related workforce would be absorbed into other mining projects or other sectors of the local economy.

In assessing cumulative impacts primary consideration was given to the combined effects of the proposed project and the Cyprus Mining Corporation Thompson Creek molybdenum mine now under construction approximately 45 miles southwest of Challis. The distribution of impacts from the two projects overlap but are not competitive in the sense that long-term operation impacts from the Thompson Creek Project on Salmon are expected to be minimal, just as the Blackbird Project would have insignificant effects on Challis.

A draft comprehensive plan for Lemhi County was recently completed by the East-Central Idaho Planning and Development Association (ECIPDA), the regional planning organization for Lemhi and Custer Counties. Implementation of the plan would entail development and enforcement of a county subdivision ordinance, zoning ordinance, mobile home ordinance, and highway access ordinance. These ordinances would provide the county with effective planning tools for directing and controlling growth within county jurisdictions, particularly since most of the growth would be expected to occur in Salmon and adjacent unincorporated county areas.

Population

In the absence of the proposed project, it is anticipated that Lemhi County would continue to experience moderate growth, while Custer County would grow significantly due to the Thompson Creek Project. The two counties are expected to grow by approximately 8 and 64 percent respectively by 1986, the projected date by which the full population effects of the Blackbird mine would occur. The City of Salmon would grow by 279 people or 8 percent during this period, while Challis would experience nearly 70 percent growth, primarily due to the 1,475 population influx projected for the Cyprus Mines Thompson Creek Project by 1983 (VTN 1980).

An incremental population increase of 1,153 people is expected with the Blackbird Project (ECIPDA 1980). Of this total, approximately 90 percent or 1,038 would reside in Salmon, 80 or 7 percent in Cobalt, and 35 or 3 percent in Challis. A few incoming residents would settle in scattered locations elsewhere in the study area, but these numbers are not considered significant. This population distribution was based on highway access and distance, planned road improvements, and existing population and community infrastructure. Approximately half of the population increase would be Noranda employees and their families; the remainder would be service sector employees and their families.

The incremental population associated with the project represents a 14 percent increase over baseline 1986 projections for Lemhi County and less than 1 percent growth in Custer County. In contrast, total population change over 1980 levels with the project is estimated to be 23 percent in Lemhi County and 65 percent in Custer County, reflecting the effect of the Thompson Creek Project.

Economic Base

Without the proposed Blackbird Project, the Lemhi County economy would continue to gradually expand from the predominant agriculture and forestry base toward increased mining, recreation, and tourism, although mining activities would play a far less significant role than if the project is developed. Federal resource management policies and other external factors such as market conditions would have a major influence on economic activities. Agriculture, primarily livestock grazing, would remain the mainstay of the local economy, although the economic position of local farmers is being gradually eroded by rising operating costs. A growing number of farms would be subdivided into ranchettes and second home developments, particularly in the Salmon area. It is anticipated that the local timber economy would remain depressed until housing and other construction and other wood product industries increase demands for timber. Similarly, the local tourist industry has been affected by rising gasoline prices and the reduction in salmon and steelhead fisheries.

Mining would clearly emerge as the dominant factor in the Custer County economy due to development of the Thompson Creek Project, with related expansion in other sectors, particularly construction, trade, and services. Similar changes would occur in Lemhi County as a result of the Blackbird Project. Mining would become a major component of the local economy. The project payroll, corporate spending, and increased tax revenues generated would also stimulate expansion of public and commercial services in response to project-related demands. Salmon's position as a regional trade center would be strengthened, and the diversity of goods and services available should expand. The project would thereby offset anticipated downturns in other sectors, such as forestry, and stabilize spending in the trade and services sectors which are currently adversely affected by seasonal and other fluctuations in local expenditures.

Employment and Income

The total employment impacts of the proposed project are summarized in Table 5-5. Total project-related employment includes both the direct Noranda workforce and indirect or service employment created by the project. In accordance with economic base theory, it is estimated that each direct Noranda job would result in an additional 0.94 service jobs (Davies and Reading 1980). Based on these factors, the proposed project would result in a total employment increase of 904 jobs, 466 Noranda positions and 438 service jobs. It is estimated that 55 percent of these total positions would be filled by non-local or in-migrating workers, although approximately two-thirds of the existing Noranda workforce was hired locally (ECIPDA 1980). This ratio is expected to drop as the workforce expands due to the limited number of trained underground mining personnel in the study area.

TABLE 5-5

EMPLOYMENT IMPACT SUMMARY AND DISTRIBUTION, DIRECT AND INDIRECT WORKFORCE, 1986 AND BEYOND

	Direct Employment			Indirect Employment			Total Employment		
	Local	Non-Local	Total	Local	Non-Local	Total	Local	Non-Local	Total
Lemhi Co.									
Salmon	146	192	338	191	233	424	337	425	762
Cobalt	53	49	102	0	0	0	53	49	102
Subtotal	199	241	440	191	233	424	390	474	864
Custer Co.									
Challis	11	15	26	6	8	14	17	23	40
Total	210	256	466	197	241	438	407	497	904

Sources: Noranda Mining Inc. and ERT, 1981 based on factors described in the Socioeconomic Technical Report.

The distribution of new project-related households and related population growth is shown in Table 5-6. The majority of project-related employees would reside in Salmon, although it is estimated that approximately 50 to 100 single-status employees would live at Cobalt in existing dormitory facilities and other housing owned by Noranda. Additional housing for single construction contractor workers would be provided at an adjacent construction camp. It is estimated that the majority of the remaining single employees and 95 percent of married workers would live in Salmon, while 5 percent of the married workers would live in Challis or other scattered locations.

TABLE 5-6

DISTRIBUTION OF NON-LOCAL EMPLOYEES, NEW HOUSEHOLDS, AND POPULATION INCREASES, FULL EMPLOYMENT LEVEL (1986)

	Direct Workforce			Indirect Workforce			Total Impacts		
	Employees	Households	Population	Employees	Households	Population	Employees(%)	Households(%)	Population (%)
Lemhi County									
Salmon	192	149	469	233	180	567	425(85%)	329(85%)	1,038 (90%)
Cobalt	49	38	80	-	-	-	49(11%)	38(11%)	80 (7%)
Total	241	187	549	233	180	567	474(96%)	367(96%)	1,118
Custer County									
Challis	15	12	26	8	6	13	23(4%)	16(4%)	35 (3%)
Total	256	198	574	241	185	579	497	383	1,153

Sources: Noranda Mining Inc. and ERT, 1981 based on factors described in the Socioeconomic Technical Report.

Note: Some columns do not add due to rounding.

Direct project employment would expand from the current 100-person workforce to a total of 466 employees at full employment levels projected for 1986 through the life of the project (Figure 4-1). Based on known reserves the mine would remain in operation at the 1,200 tons per day production level until approximately 1997. At that time, employment would gradually decline as operations are phased out when reserves are depleted, but the date at which this would occur cannot be predicted at this time.

The gradual increase in employment associated with the Blackbird Project would minimize the effects of a sudden increased demand on community services and housing, and a large population turnover resulting from switching from an independent construction workforce to a separate operation workforce. Additionally, the build-up in operations staff will coincide with the reduction in construction workers.

The total effect of the Blackbird Project would be a 30 percent increase in Lemhi County employment over pre-project levels, with a five-fold increase in the mining sector. These employment increases represent a significant beneficial impact on the local economy, particularily since they would help offset potential continued employment declines in other basic sectors such as forestry, and reduce the high unemployment rates experienced in recent years.

Without the proposed project or the Thompson Creek Project, regional income would increase with inflation and modest growth in some sectors, but relative gains would be slight. Total payroll for the Blackbird Project would increase from $2.95 million in 1980 to nearly $15.2 million (1984 dollars) at full employment levels. The annual average wage for full-time Noranda employees would be slightly over $29,000 (1984 dollars). It is assumed that approximately 42 percent of employees' wages and salaries represents net disposable income, with 58 percent allocated to taxes, housing, and savings. It is further assumed that virtually all of this income would be spent locally, mostly in Salmon, but with a small percent spent in Challis in proportion to the project-related population living there.

Assuming a total disposable annual income of $6,413,300 (42 percent of full employment payroll of $15,269,800), approximately $6,028,500 would be spent in Lemhi County and $384,800 in Custer County. Assuming an average service sector wage of $15,000, an additional $2,759,400 in disposable income would be generated at full employment, for a total of $9,172,700. This new income generation, together with the corporate spending and increased tax revenues constitutes a significant economic benefit to Lemhi County and a minor benefit to Custer County.

Financial Resources

The primary sources of revenue for Lemhi and Custer counties and the cities of Salmon and Challis are the property tax, enterprise funds, (e.g., fees for water, sewer, and waste disposal), and sales tax revenues. School districts are supported by property taxes, bond issues for capital improvements, and state disbursements.

The State Department of Revenue and Taxation projects that under HB 389, which implements the 1978 "1% initiative" (Section 2.13) the property tax base of Lemhi County would increase from 1980 to 1981 by 19.1 percent, to $38,100,000; while Custer County would experience a 17.1 percent gain, to $106,200,000. Without the proposed project, Lemhi County jurisdictions would be basically limited to this 5 percent ceiling while Custer County and School District #181 would realize half the assessed valuation of the Thompson Creek Project, which has a projected full market value of $350 million in 1983, a six-fold increase over the 1979 tax base (VTN 1980).

The proposed project would generate tax revenues in a number of categories including Federal Corporate Income Tax, State Corporate Income Tax (6.5 percent of taxable income); State Mine License Tax (2 percent of net proceeds), net profit on mines tax, property tax, and sales tax on corporate purchases. Additional sales tax revenues would accrue from personal spending of the net disposable income.

The total estimated capital construction cost of the mine and mill facility is $113,900,000 (1984 dollars), which includes such items as the costs of development of additional on-site mine and mill facilities and ancillary facilities such as access roads, utility lines, and other services; acquisition of land and mining equipment; and working capital. Because a substantial amount of this total is property tax exempt, e.g., environmental control measures such as the tailings dam and other pollution control equipment, while others are subject to other taxes, such as vehicle license taxes, the estimated amount subject to property taxes is $36,122,000 (1984 dollars) (Noranda Mining Inc, 1982). Assuming that the affected taxing jurisdictions (primarily Lemhi County and School District #291) exercise the "50% growth option" allowed under HB 389, the property tax base of Lemhi County associated with the mine and mill facilities would increase by a total of $18,061,000 at full production levels, gradually increasing over the life the project due to additional annual incremental capital investments of approximately $1,000,000, with associated increases in property tax revenues. Corresponding increases in the total actual tax base (assuming the 50 percent option) resulting from new residential construction would be $3,200,000 in Lemhi County (including Salmon) and $244,000 in Custer County (including Challis) (1981 dollars).

Project-related property tax revenues would be generated in a number of categories, including the new mine and mill facilities, new residential construction; and the net profits on mines tax. At current mill levies, the project facilities would generate annual additional property taxes of $39,800 to Lemhi County and $105,400 to School District #291 (all values in 1984 dollars). Residential property tax revenue increases resulting from the project are estimated at $18,700 to School District #291, $3,500 to Lemhi County, and $11,000 to the City of Salmon, assuming half of the new households in the Salmon area are located within the city limits and half in adjacent county areas. Comparable figures for Custer County are $1,000 for

School District #181, $200 for the county, and $400 for the City of Challis (all 1981 dollars). In addition, Lemhi County and School District 291 would collect a net profit on mines tax of $15,300 and $40,400 respectively. This tax is an ad valorem (property tax) levy on the net proceeds of the mine, estimated at $13,850,000 per year (1984 dollars), or $6,925,000 in actual new tax base subject to the 50 percent option provision of HB 389. These figures are based on an average annual market price of $22.50 for cobalt and $1.25 for copper, and could fluctuate considerably based on changing market conditions (See Table 5-4). It should be noted that all property tax projections presented in this analysis are based on current mill levies, and therefore represent only a hypothetical estimate of the <u>actual</u> tax revenues which would be generated given applicable tax exemption statutes, local fiscal policy decisions, and mill levies at the actual time of assessment.

Of total sales tax revenues generated at the 3 percent sales tax rate, 10 percent is distributed among county taxing jurisdictions in proportion to mill levies, and 10 percent is allocated to the School Income Fund for statewide distribution. Assuming maximum annual local expenditures of $6,413,300 by direct employees and $2,759,400 by indirect employees, a total of $27,500 would be returned to local governments, with a similar amount going to the School Income Fund. Corporate purchases of goods and services are estimated to be approximately $1,000,000 per month at full production of which approximately 40 percent or $4,800,000 per year would be subject to sales tax. Approximately 25 percent of these supplies, or $1,200,000 per year would be purchased locally, 29 percent elsewhere in Idaho, and 46 percent out-of-state. The $1,200,000 spent in Lemhi County would generate $36,000 in tax revenues, with $3,600 returned to local jurisdictions. The State School Income Fund would also receive $3,600. Total increased sales tax revenues accruing to taxing jurisdictions within Lemhi County would therefore be $30,000, while Custer County would receive $1,100 annually. Based on current distribution formulas, Lemhi County would receive $14,400 or 48 percent of the total revenues returned, while the City of Salmon would receive $13,200 or 44 percent of this amount. The School Income Fund would accrue a total of $31,100 for statewide distribution among districts.

All of the above taxes represent a positive economic impact, with the most significant benefits experienced by Lemhi County, School District #291, and the City of Salmon. The net fiscal benefit resulting from the proposed project should provide most of the affected taxing jurisdictions with the tools to offset the costs of providing expanded public services to new project-related populations. However, it is expected there would still occur some short-term disruptions and dislocations in the public services required by the new population.

<u>Land Use</u>

Both Lemhi and Custer Counties have been experiencing significant changes in private land use as a result of decreasing economic dependence on agriculture and

increasing emphasis on tourism. Federal land holdings in the national forests and BLM land, which make up over 90 percent of the land area, have undergone relatively little change except for increased mineral exploration and the designation of large tracts as wilderness.

The proposed project would not significantly change land use patterns in and around the mine site because they are compatible with past mining uses. Specific provisions in the River of No Return Wilderness Act of 1980, recognize the importance of cobalt mining in the special mining management zone. The project would not have any major adverse effects on this wilderness area.

New population drawn into the region as a result of the project would tend to foster urban sprawl around the City of Salmon, such as that seen in Challis associated with the Thompson Creek Project. There are an estimated 500-800 building lots available in and around Salmon, but further subdivision of land can be expected, especially to accommodate mobile homes. Passage of a proposed new zoning ordinance could direct subdivision activity away from valuable agricultural tracts and encourage this activity in areas where it is most suitable.

Housing

The proposed project is expected to create a peak employment demand of 383 housing units: 367 housing units in Lemhi County, and 16 in Custer County (Table 5-7). The majority of new households, 329 (or 86 percent) would be located in the City of Salmon, 38 in Cobalt, and 16 in Challis. Some of these households may reside in surrounding unincorporated areas, but for purposes of this study they are assumed to locate in the particular community. It should also be noted that the employment buildup would be gradual, thus reducing the potential abrupt impact on the housing market in Lemhi County.

The following housing mix for new households is projected to occur by 1986: 35 percent single-family units, 15 percent multi-family, and 50 percent mobile homes. The short project time span, current high interest rates, lack of rentals, and high cost of single-family home construction should encourage the development of mobile home housing.

The future supply of housing types is difficult to forecast, but there are indications that the private sector would be able to provide the needed number of mobile home spaces within new trailer parks. One trailer park would add 30 more units by late 1981 and plans for a 120-unit mobile home park have recently been presented before the Salmon Planning and Zoning Commission. It is felt that a more than adequate number of mobile home lots within developed trailer parks or subdivisions would be made available. Single-family home and apartment developers have not yet announced plans to accommodate anticipated housing demand, but local banks and contractors should be able to provide housing if it is affordable. Therefore, the

private sector could readily make up for any project-related housing deficits, but the high cost of new housing could force many households to seek almost non-existent rental or other lower-cost housing alternatives.

TABLE 5-7

PROJECT-RELATED HOUSING DEMAND,
LEMHI AND CUSTER COUNTIES, 1986

County/ Community	Housing Type[1]			
	Total New Households	Mobile Home	Single-Family	Multi-Family
Lemhi County	367	165	115	87
Salmon	(329)	(165)	(115)	(49)
Cobalt[2]	(38)	(0)	(0)	(38)
Custer County	16	8	6	2
Challis	(16)	(8)	(6)	(2)
Total	383	173	121	89

Source: Old West Regional Commission 1977; Denver Research Institute 1979 and ERT 1981.

[1]The demand for specific types of housing is based on the analysis of the local housing market, costs of securing a home mortgage, other studies in the west and the professional judgement of the analyst. The specific breakdown is as follows; 35 percent single-family units, 15 percent multi-family and 50 percent in mobile homes.

[2]Housing in Cobalt is owned by Noranda and will consist of dormitory-type housing for single workers only.

Health Care

The impact of the proposed project on health care services in the study area is expected to be minor regarding facilities, but moderate for medical staffing. Steele Memorial Hospital in Salmon would continue to serve the entire study area and has adequate beds and staff to handle peak 1986 population levels. The clinic in Challis has adequate space, but additional staffing is needed even without the impact of the Blackbird Project. The number of doctors in both Lemhi and Custer Counties would need to increase dramatically, even without the Blackbird Project, by 1986. Rapid economic growth may increase mental health worker caseloads (Davenport and Davenport 1980). At the end of the project social service administration can be expected to revert to pre-project conditions.

Social Services

Social Services should continue to be adequate and the state office in Salmon that administers social service programs in both Lemhi and Custer Counties has the

manpower to serve the new population. The proposed project is expected to have a positive impact on social services in the area once construction and operation phases are underway because they would reduce unemployment.

Law Enforcement

The Lemhi County Sheriff's Department currently has adequate staffing and vehicles. Future baseline growth, however, may require the hiring of an additional patrol officer by 1986, which would also meet the additional demands of the new project-related population in Lemhi County. The proposed project would have minimal or no impact on law enforcement services in Custer County because plans call for the addition of from three to four additional patrolmen by 1984, to meet the requirements associated with the Thompson Creek Project.

Fire Protection

The proposed project should not present an increased need for fire protection services in rural areas because the vast majority of new population would be settling in Salmon. There would be a moderate increase in the chance for forest fires in the immediate vicinity of the mine and mill due to project activities. Noranda is working with the Forest Service to develop a plan to reduce the fire hazard around the mine/mill complex.

Utilities

Electrical service in Lemhi County is provided by the Idaho Power Company. It has recently installed a transmission line and substation in the Salmon area which will alleviate previous peak load problems (Behler 1980). The project will require approximately 8,000 kW of power for operations which Idaho Power would provide on an interruptible basis. The impact of the proposed project on electrical service in Lemhi County is expected to be minimal because the Idaho Power Commission curtailment policy stipulates that industrial users, such as Noranda, will have electrical service reduced prior to curtailment of domestic use. Noranda anticipates such curtailments and is installing standby generators. Electrical service to Challis would be unaffected.

An expansion and upgrading program for telephone service has been started in both Salmon and Challis to meet the demands of future customers. These programs are expected to develop enough capacity to at least maintain existing service levels when peak project population impact occurs in 1986.

With the development of planned landfills, adequate capacity for increased waste production associated with future baseline growth and that induced by the Blackbird Project is anticipated. Since waste management planning would not be completed prior to project startup, any landfills should be designed to handle the new demands.

Schools

School District #291 (Salmon) is projected to experience the largest impact from the project: a total of 198 new students at full employment levels, representing a 13 percent increase over existing enrollment (Table 5-8). School District #181 (Challis) would experience only a minor impact, nine students. No project-related enrollment increases are expected in District #292 (Leadore).

The overall potential impact from the proposed project on School District #291 would be to bring enrollment up to the facility capacity at most schools. New classrooms may not be required if all existing classrooms are used for instruction purposes and student-teacher ratios are allowed to rise above existing levels, but four levels may be needed if current conditions are considered overcrowded by the new school administration. If the district is not able to secure adequate room, then four new classrooms will be required. When total existing enrollment is added to cumulative future growth, a student/teacher ratio of approximately 21 to 1 results. This level is within the maximum stipulated by the Idaho Department of Education. At least four and as many as eight additional teachers may be needed by 1986.

Recreation

Expected population increases associated with the Blackbird Project should only moderately impact fishing streams or wildlife habitat since most of these areas are protected land holdings of the U.S. Forest Service and Bureau of Land Management. The number of game animals harvested each year is controlled by hunting regulations, however, any expanded residential or industrial development in the mountains would increase the risk of poaching. Game fish populations should remain stable because of stocking programs. Outdoor recreational facilities should not be greatly impacted by the population increase because facility use is currently under capacity except during the summer. Visitation at campgrounds, interpretive sites, and trails in the Cobalt Ranger District has increased between 1975-1979. This trend should continue with an increase in use by residents offsetting the decline in the number of out-of-state vacationers, who face increasing transportation costs. Hunting and fishing recreation should remain popular resulting in increased competition for limited permits/licenses.

Social Values

Changes in the study area and Salmon resulting from the proposed project may be perceived as reinforcing or detracting from traditional values among different groups within the community. The manner in which the project is perceived will largely depend on individual or group expectation regarding the project and its effects on their lives and the visible manifestations of the project, primarily in Salmon.

Resources Assessment Inc. has been conducting interviews with established residents of, and new-comers to, the Challis area to determine public attitude toward

TABLE 5-8

PROJECT-RELATED IMPACTS ON SCHOOL DISTRICT #291 AT FULL EMPLOYMENT LEVELS (1986)

Grades	Existing Conditions Capacity[1]	Existing Conditions Enrollment	Additional Project-Related Enrollment	Projected Surplus/ Deficiency	Comments[3]
K-3	451	454	69	-72	Existing facilities and staff cannot accommodate more students. At least 4 additional teachers needed.
4-5	300	250	35	+15	Facilities should be adequate for future needs.
6-8	417	367	43	+7	Facilities adequate but additional staffing may be needed.
9-12	475	430	51	-6	Project-related students would bring enrollment to slightly over capacity. Additional staffing and classrooms may be needed.
Total	1,643	1,501	198	-56	

[1]Capacity information was provided by Cook 1980.

[2]Analysis does not attempt to forecast non-project related enrollment changes by 1986. Total numbers of school-aged children were distributed in the following manner; 61% in grades K-6 and 39% in grades 7-12 (Stonehaven Corp. 1981).

[3]Comments relate to facility capacity and staffing requirements and are based on given capacities and problems cited by Cook 1980.

Source: Cook 1980; Stonehaven Corp. 1981 and ERT 1981.

the Cyprus Mining Corporation project (Challis Messenger May 8, 1980). Survey results may provide some insight to future public opinion on the Noranda project in Salmon. Traditional values in Salmon vary somewhat from those in Challis, however, due to lesser emphasis on agriculture and a greater orientation towards a diversified commercial base, with a correspondingly greater diversity of public attitudes and values. A spectrum of public opinion also prevails due to the presence of newer residents attracted to the area by its scenic beauty and pastoral lifestyle resulting in the emergence of new social groups and coalitions.

Employment opportunities created by the Blackbird Project will be seen as a major benefit, particularly if they allow younger people to remain in the area. The general economic growth associated with the Blackbird Project will likewise be perceived as preserving the quality of life by offsetting declines in the Lemhi County economy, e.g., forest products.

The elderly and other fixed income groups may be adversely affected by inflation. The net effect is often increased public assistance applications and mental health care caseloads creating a general perception of decline in quality of life.

A critical factor influencing perceived impacts on traditional values is the visible change in the study area communities. The type and distribution of new residential development, increased traffic, and new shopping areas are especially important in Salmon where the community strongly identifies with an attractive rustic and pastoral character.

An effective public information program by Noranda regarding employment (hiring schedules and skill qualifications), zoning regulations, company transportation provisions, mine operation phase-out and planned employment reduction should aid in alleviating public apprehension and reinforcing positive realistic attitudes and expectations.

Transportation

The proposed project may have several major effects on roadway transportation in the area, including higher traffic levels, increased maintenance requirements, a higher accident probability, and the potential for hazardous materials spills. Noranda is currently negotiating with the U.S. Forest Service and Lemhi County regarding needed road improvements and maintenance responsibilities. At this time, plans call for the transportation of the majority of workers from Salmon or Cobalt to the mine by company-supported buses or vans. Workers would, of course, have the option to drive their own cars, but because of the rough roads and fuel expenses, it is believed that the majority would utilize the mass transportation option.

The route of travel from Salmon is expected to be over Williams Creek, Deep Creek, and Panther Creek Roads; while Challis residents would use the Morgan Creek - Panther Creek Route. Table 5-9 shows the origins of workers and the estimated

number of vehicle trips. This analysis assumes that all workers living in Salmon and Cobalt would utilize mass transit, operating between Salmon, Cobalt, and the mine, resulting in a total light traffic increase of 46 average daily traffic (ADT) vehicle trips. This would be year-round rather than the typical summer-use pattern. Heavy truck traffic for ore concentrate transport and other needs would also result from the project. Again the Deep Creek Route is the primary corridor. The projected truck traffic volume associated with the mining operation is 20 ADT vehicle trips per day (Jereb Engineering 1980). Therefore, total traffic increases for all roadways combined would be a maximum of 66 ADT.

TABLE 5-9

LIGHT AND HEAVY TRAFFIC DENSITIES FROM THE BLACKBIRD PROJECT, 1986

Community of Origin	No. of Employees	Number of One-Way Vehicle Trips Per Day[1]	Heavy Truck Vehicle Trips[3] Per Day
Salmon/U.S. 93	338	9	20
Cobalt	102	4	0
Challis	26	10	0
Total	466	23[2]	20

Sources: Jereb Engineering 1980 and ERT 1981

[1]The percent of workers in each shift was taken from Jereb, 1980. The transportation of employees by specific type of vehicle was calculated by assuming full utilization of 40-passenger buses, and 10-passenger vans. No company transportation options are available to Challis residents and it is assumed that an average of 2.5 persons per vehicle will drive private cars.

[2]This value represents the one-way vehicle trips only. ADT would depend on the utilization of vehicles but for this analysis is it assumed that ADT equals 2 times the one-way vehicle trips.

[3]This value is the number of heavy truck trips per day taken from Jereb 1980.

Comparing existing use levels and project-related use, the greatest percent increases in traffic over existing ADT levels would be on the Deep Creek Road, (135 percent increase) followed by the Panther Creek Road, (49 percent increase). Many of the roads already have the capacity to absorb the projected increases in traffic. With the roadway improvements being considered, all of the roadways would be able to adequately handle the additional vehicle loadings (Jereb Engineering 1980). Increased traffic levels and year-round access would require expanded road maintenance. The responsibility for this maintenance is being negotiated between Noranda, the U.S. Forest Service, and the county.

Transportation safety is another concern with increased traffic levels. Roadway improvements and maintenance would tend to decrease the probability of accidents. A transportation accident probability analysis showed that the probable number of employee accidents with injuries is 0.95 per year.

The transportation of ore concentrates, reagents, and hazardous or toxic materials, including sulfuric acid, and cyanide over mountain terrain and along streams is another concern. Contamination of streams could result from an accident on roads that follow stream courses. Spill frequency is based primarily on shipping frequencies and roadway conditions and the hazard presented by contaminating waterways is considered to be relatively minor. Accident probability analysis indicates approximately .025, .027, and 4.9 spills of sulfuric acid, reagents, and ore concentrates, respectively, can be expected over the 20-year mine life. Spills of solid materials are generally much smaller, pose less of a toxic hazard, and are more easily contained and cleaned up than liquid spills.

5.2.12.1 City of Salmon

Land Use

Development of the proposed project would have both positive and adverse effects on land use in Salmon. The economic benefits would allow many businesses and homeowners to upgrade their product lines and facilities. Assuming a new zoning ordinance is passed prior to project startup, the city would have a better opportunity to channel growth into the most suitable locations and to extend public services to only those areas that can be economically accommodated.

Housing

A total of 102 housing units are currently available in Salmon, but total project-related demand is forecast to be 329 by 1986, leading to an overall deficit of 227 housing units. The future supply of housing in Salmon is difficult to forecast because of the rapidly changing economic conditions in the county. It is estimated that there are about 70 single-family homes for sale in and around Salmon. Many of these homes, however, cannot be easily financed and are priced over $50,000. It should be noted that difficulty in finding affordable housing is a national, as well as, local concern. Assuming current conditions prevail, it is projected that the private sector would provide more than enough lots for mobile homes in either mobile home parks or subdivisions by 1986. The key issue, however, would be affordability of housing, not the ability of the local housing sector to produce enough units.

Water Supply

The existing 6.8 million gallons per day (mgd) pumping capacity of the domestic water supply system would be adequate to meet the projected 1986 non-project related growth requirement of 2.9 mgd. The proposed project is expected to create additional demands of 0.2 mgd by the peak employment year of 1986, assuming average per capita consumption of 150 gallons per day. New capacity would not be required to allow the

city to meet the demand for domestic water. Increased demand is expected to be gradual, reflecting relatively slow employment increases. Even without the proposed project, the water distribution system may need to be improved.

Wastewater Treatment and Solid Waste Disposal

The Salmon wastewater treatment system is currently operating above the design capacity and not meeting the requirements of its discharge permit. The city is in the planning stage of a treatment plant expansion for which a capacity of 2.0 mgd is being considered (Marshall 1981). Growth in Salmon is expected to be moderate without the project and by 1986, service requirements for a treatment plant would be 1.9 mgd. The additional demand for sewage treatment from the projected 1,038 new project-related residents in Salmon is expected to be moderate. Applying an average daily production estimate of 168 gallons per capita, new residents would produce sewage volumes of about 0.2 mgd. This increment plus that of non-project related growth brings total peak demand in 1986, to 2.1 mgd. Since Salmon's treatment plant expansion is in the planning stage, the capacity could be designed for at least 2.1 mgd with minimum additional effort and expense. Appropriate service connection fees could be required for any new construction to help ameliorate the expense of the proposed expansion.

Law Enforcement

The majority of the population impact from the project would be felt within Salmon and would affect law enforcement service levels. At least one additional officer would be required to meet the needs of future baseline growth and two new officers may be need for for project-related growth. by 1986, to meet the demands of an additional 1,038 residents (assuming 2.0 officers per 1,000 population and 0.33 patrol cars per officer) (Chalmers and Anderson 1977). Project-related demand would require one additional vehicle, although the department can continue to share dispatchers with the Sheriff's Department.

Fire Protection

Fire protection coverage in Salmon of additional housing units resulting from the project would represent a substantial increase for the Salmon volunteer fire department. Additional pumping equipment, however, would not be required for the projected 1986 population level based on pumping capacity planning standards. For city fire departments serving a population of less than 10,000 persons, a volunteer department is usually considered adequate (Chalmers and Anderson 1977). Salmon will be approaching the size when it should consider employing full-time personnel, but this would not be necessary to satisfy project-related impact.

Recreation

The City of Salmon has adequate recreation facilities in the community with Island Park, the golf course area, and use of play areas at public schools. These facilities should have sufficient capacity for the expected population increase. The Draft Lemhi County Comprehensive Plan (1981) lists the need for further development of children's recreation facilities. Implementation of the proposed project would not have a significant effect on recreation facilities or opportunities because adequate opportunity currently exists. The only area of concern might be the provision of recreational opportunities for very young children.

5.2.12.2 City of Challis

Land use in Challis is undergoing changes associated with the Thompson Creek Project. The Blackbird Project would not have a large enough population impact in Challis to affect land use patterns.

The Blackbird Project is projected to create a demand for approximately 16 new households in Challis by 1986. This additional housing demand would occur during the same period when the Cyprus operations workforce would be expanding. Affordable housing would be particularly difficult to find for non-Cyprus workers and their families.

The proposed Blackbird Project would not have a large impact on the town water system because the associated population increase is small relative to the expansion that would be required with the Cyprus operation.

The Blackbird project's associated population residing in Challis would produce less than 10,000 gallons per day of sewage. This amount represents an insignificant contribution to the system compared to other new developments in the area.

The Blackbird project is not expected to have any large impact on law enforcement or fire protection services within Challis because of Noranda's low population effects. Additional minor traffic problems may occur on the roads leading from Challis to the mine because of increased traffic. The proposed project would not have a significant effect on fire protection services in Challis because of the small population increase resulting from the Blackbird Project.

There would be no significant impact from the proposed project on recreational opportunities in the City of Challis.

Summary

The socioeconomic effects of the Blackbird Project are primarily the direct economic benefits associated with increased employment and local income and the indirect effects, both beneficial and adverse, resulting from increased population in the study area. These effects are assumed to be short-term and reversible lasting for

the duration of the project, followed by a return to pre-project conditions. It is expected, however, that a net residual benefit will occur, assuming that portion of the project-related workforce would be absorbed into the local economy, and that with proper planning, continued economic diversification could occur. The primary cumulative impacts would result from the combined effects of the Blackbird and Thompson Creek projects on the two-county study area. The effects of these projects overlap but are not competitive in that the operation effects from the Thompson Creek Project on Salmon are expected to be minimal, and the Blackbird Project would have insignificant effects on Challis.

5.2.13 Cultural Resources

The No Action Alternative would not cause any adverse impacts on cultural resources in the study area as no additional areas would be disturbed.

The cultural resources survey of the project area identified three cabins in upper Blackbird Creek at the site of the fresh water reservoir and tailings impoundment. On October 14, 1981 the Forest Service Zone Archeologist conducted a preliminary investigation of the three cabins and dated them to the 1870-1910 period. Based on this investigation, the Forest Service concluded that the cabins are eligible for nomination to the National Register of Historic Places and that the significant data can be recovered through a salvage program. On November 4, 1981 the State Historic Preservation Officer concurred with these findings. A mitigation plan is being developed for review and approval by the Forest Service, the SHPO, and the President's Advisory Council on Historic Preservation. Once approved, this plan will guide the salvage process and ensure that the resources present are recovered prior to any project-related disturbance.

If there is significant surface disturbance involved in the relocation or upgrading of the Napias Creek, Deep Creek, Morgan Creek, or Blackbird Creek Roads, the Forest Service would conduct a survey to locate, identify, and evaluate cultural resources which might be impacted.

<u>Summary</u>

The Blackbird Project would directly affect cultural resources in the study area. However, the proposed salvage program would recover any significant data and prevent the loss of these resources.

6.0 EVALUATION OF ALTERNATIVES

6.1 Introduction

Following the definition of the effects of implementation in the previous chapter, the three action alternatives and the No Action Alternative were compared against the evaluation criteria presented in Chapter 3 of this EIS. The major objective of this process was to identify the most significant consequences (adverse and beneficial) of each alternative, if that alternative were implemented.

This chapter includes a discussion of the evaluation criteria which were developed from issues, concerns, and opportunities identified in the public involvement program. The evaluation distinguishes between criteria considered uniquely important to this project and those criteria considered common (general) to all projects on public lands. A summary matrix of the major effects of implementation of the four alternatives is presented in Table 6-1. The discussion and evaluation focused on identifying: 1) whether or not the alternative meets the respective evaluation criteria; 2) if the effects are adverse or beneficial; and 3) the extent of the effects (no effect, minor effect, significant effect). No effect means that during operations and/or after abandonment, conditions will be essentially similar to historic conditions. Minor effects are of a temporary nature and are small in area of influence; they are of limited magnitude and severity. Significant effects are of large magnitude or severity; they are extensive in area and usually extend beyond the duration of the project. The evaluation assumes that all management constraints and guidelines and mitigation measures identified in Chapter 4 will be implemented.

Of the 21 evaluation criteria presented in Table 6-1, the first eleven were considered of greater importance to this project than the remaining 10. This was the case largely because these concerns were expressed by the public, identified during the scoping process, or were concerns expressed by the Forest Service resource specialists who have experience in the area and are charged with management responsibilities for the surface resources. These eleven criteria were given greater consideration in the evaluation than the remaining criteria.

Threatened and endangered plant or animal species were not considered in this evaluation because the U.S. Fish and Wildlife Service stated, as a result of informal consultation under Section 7 of the Endangered Species Act, that no endangered animal species would be affected. However, four sensitive species of plants could possibly occur in the areas of disturbance. Subsequent botanical surveys in September 1980 and June 1981 failed to locate any of the plants identified by the Fish and Wildlife Service.

TABLE 6-1

EVALUATION OF ALTERNATIVES

	No Action	Alternative 1	Alternative 2	Alternative 3
1. The alternative should not degrade or should improve surface water quality.	No effect, as water quality would degrade back to historical conditions.	Would yield small improvements to Blackbird Creek and neglibible improvements in Panther Creek. At abandonment would leave conditions better than historical. The upper tailings dam would experience small flood volumes and have good long-term stability.	Same operational improvements as Alt. 1. Tailings dam would capture all seepage from West Fork tailings. The lower tailings site is more complex, is subject to larger flood volumes and has higher potential for long-term adverse effects.	Flows in Blackbird Creek would not be reduced by mine/mill consumption, but dilution flows in Panther Creek would be reduced, thus resulting in lower water quality than Alt. 1 or Alt. 2. Lower tailings dam effects as in Alt. 2.
2. The alternative should not degrade or should improve fishery resources.	No effect over historical conditions.	Minor improvements in potential recovery of fisheries from improved water quality during operations and abandonment.	Same as Alternative 1.	No potential for improving fisheries during operations. Minor potential at abandonment.
3. The alternative should not significantly affect wildlife or degrade wildlife habitat.	No effect.	Significant effects on habitat, but habitat is little used yielding overall moderate adverse effects.	Minor effects on wildlife and habitat.	Same as Alternative 2.
4. Adverse effects on socioeconomic resources must be minimized, and positive effects must be maximized.	Moderate negative effects from loss of pilot project investment, 100 jobs lost, no accrual of tax monies to city, county, and state.	Adverse effects from increased population would be mitigated and offset by benefits from jobs, purchases, and new tax revenues. There would be short-term dislocations and disruptions in social services.	Same as Alternative 1.	Same as Alternative 1.
5. The alternative should effectively contribute to production of cobalt and reduce dependence on foreign sources.	Does not meet this criteria in any way.	Most cost effective because facilities are clustered, least expensive to construct.	Not as cost effective, would cost 24% more to construct than Alt. 1.	Similar to Alternative 2, would cost 22% more than Alt. 1 to construct.
6. The alternative should not adversely affect the River of No Return Wilderness.	No effect.	No effect.	No effect.	No effect.
7. The alternative should not adversely affect the Wild and Scenic designated segment of the Salmon River.	No effect.	No effect.	No effect.	No effect.

TABLE 6-1 (CONTINUED)

	No Action	Alternative 1	Alternative 2	Alternative 3
8. The alternative must comply with existing local, state and federal laws and regulations.	Not in compliance with the General Mining Law of 1872.	In compliance.	In compliance.	In compliance.
9. The alternative should be economically feasible for the public sector.	No effect.	Forest Service management costs for project are acceptable.	Same as Alternative 1.	Same as Alternative 1.
10. The alternative must be technically feasible.	No effect.	Most feasible; most straightforward to construct.	Large diversion tunnels and long lengths of pipelines make this technically more difficult.	More technically difficult than Alt. 2 because of Panther Creek diversion dam and increased pieplines and powerlines.
11. The alternative should provide long-term restoration and stability of new disturbed areas.	No effect.	Moderate potential, as all facilities located in upper Blackbird Creek where soil conditions are better and soil volumes greater. Water supply dam will provide some protection of the tailings dam.	Minor potential because of poor soils and low soil volumes. Lower tailings dam would experience higher flood volumes.	Same as Alternative 2.
12. The alternative should not degrade archeological, historical and paleontological resources.	No effect.	Historical resources in Blackbird Creek would benefit from a survey and inventory.	Same as Alternative 1.	No effect.
13. The alternative should not reduce surface water quantities.	No effect.	Minor reductions in Blackbird Creek flow during operations. Minor benefit at abandonment as water reservoir would attenuate flood flows.	Minor reductions in Blackbird Creek flow during operations. Attenuation of flood flows at abandonment is negated by larger drainage area above lower tailings dam site.	Insignificant reduction in Panther Creek during operations.
14. The alternative should not degrade groundwater quantities or quality.	No effect.	Minor reduction in flows in area around mine during operations. Quality would be improved during operations by collecting and treating mine water. Benefits at abandonment from increased storage volume in the mine, and from improved quality.	Sames as Alternative 1.	Sames as Alternative 1.

TABLE 6-1 (CONTINUED)

	No Action	Alternative 1	Alternative 2	Alternative 3
15. The alternative should not degrade air quality.	No effect.	Minor effects from dust generation and diesel generation of electricity.	Same as Alternative 1.	Same as Alternative 1.
16. The alternative must be consistent with requirements of the Forest Service's Red Rock Peak Land Use Plan.	No effect.	In compliance.	In compliance.	In compliance.
17. The alternative should provide for maximum safety on National Forest roads.	No effect.	Upgrading the preferred corridor and increased maintenance will meet this criteria. Transportation and handling of hazardous materials will be a greater hazard than in the past.	Same as Alternative 1.	Sames as Alternative 1.
18. Any increased electricity demands should not degrade existing service or reliability.	No effect.	No effect as Noranda power will be interrupted if demand exceeds supply.	Same as Alternative 1.	Same as Alternative 1.
19. The alternative should not degrade existing range, timber, or recreation programs of the Forest.	No effect.	Insignificant effect.	Insignificant effect.	Insignificant effect.
20. The alternative should not impair existing Forest Service research programs.	No effect.	Insignificant effect.	Insignificant effect.	Insignificant effect.
21. Project components should be designed and located to ensure long-term stability and minimal maintenance following abandonment.	No effect.	Best potential because of location high in the drainage, the water reservoir offers flood protection for the tailings dam, and all diversions around facilities are open channels.	Less potential because lower tailings dam site not as good geologically, larger flood volumes would be experienced, and the major diversions are closed tunnels which can more easily plug and fail.	Same as Alternative 2.

6.2 Evaluation of the No Action Alternative

The No Action Alternative would mean Noranda could continue its pilot operation for up to two years but could not expand its operation. The alternative would not allow the production of significant amounts of cobalt concentrate and would thus contribute to the continued dependency on imported cobalt with its attendant balance of payments deficit and potential for termination of supply. Water quality conditions would revert back to historical conditions from the improved conditions currently provided by Noranda's pilot operation. However, reversion back to historical conditions is considered as no effect on water quality. This alternative would cause essentially no change to soils, vegetation, wildlife, or aquatic life.

Economically, the alternative would have numerous negative effects. If not allowed to expand, Noranda would essentially lose the significant investment it has made in exploration and the pilot operation. Approximately 100 people would lose their jobs if the No Action Alternative were implemented. Additionally under No Action, the county and state would not accrue any of the tax benefits that would be derived from any of the action alternatives.

In general, the No Action Alternative would not cause any effects on the evaluation criteria. However, the alternative would not meet the "Cost-effective" or "Compliance with laws and regulations" criteria. Noranda would have no way of recovering its investment, and the alternative would conflict with the General Mining Law of 1872 which allows mining on public lands when conducted in an environmentally acceptable manner.

6.3 Evaluation of Alternative 1 (Proposed Action By Noranda): Upper Blackbird Creek Water Reservoir and Tailings Impoundment

Alternative 1 would yield minor water quality improvements to Blackbird Creek during operations with negligible improvements in Panther Creek. At abandonment, the alternative would yield better water quality than historical conditions. The interdisciplinary team determined that the upper tailings impoundment location was preferable to the lower site for water quality at abandonment because less of Blackbird Creek would be disturbed during operations and the higher impoundment location would not experience as large flood volumes which could adversely affect the tailings impoundment. The implied benefits of the upper tailings dam at abandonment cannot, however, be quantified.

Alternative 1 would have minor beneficial effects on aquatic biota and would improve the potential for the recovery of fisheries due to improvements in water quality. Alternative 1 would have significant negative effects on wildlife habitat in the upper Blackbird Creek drainage, even though wildlife using this area are not numerous, so overall effects are moderate. The locations of the tailings dam and the water reservoir in upper Blackbird Creek are in areas of much higher quality habitat

than lower Blackbird Creek, but the actual area of disturbance by Alternative 1 is less than Alternative 2. Upon abandonment the water reservoir would provide a minor benefit as new aquatic and riparian habitat.

Adverse social and economic effects with this alternative would be minimized or balanced by several economic benefits, although to no greater or lesser degree than Alternatives 2 and 3. The alternative is considered the most cost-effective by Noranda as it would cost the least to construct. Alternative 1 would not have any effects on the River of No Return Wilderness or the section of the Salmon River designated as a Wild and Scenic River. The historical resources in upper Blackbird Creek would be surveyed as a result of implementing Alternative 1, and this was considered a minor benefit.

Surface water flows of Blackbird Creek would be slightly reduced during the operation of Alternative 1, as well as Alternative 2, but this was not considered significant. Significant benefits to surface flows would occur at abandonment with this alternative because the water reservoir would act to attenuate flood flows which could adversely affect the tailings dam. The attenuation of floods at the tailings dam would be more effective than in Alternative 2. Groundwater flows in the immediate area of the mine would be reduced to a minor extent during operations of Alternative 1, as well as Alternatives 2 and 3, because the increased mine workings would draw down the water table. At abandonment, the increased storage volume of groundwater in the mine would serve to even out the flows to springs and seeps and is considered a minor benefit for all three alternatives. The quality of groundwater from the mine area would be improved during operations by collecting it and treating it, and at abandonment by reducing the oxidation of sulfide rocks and the subsequent generation of acid mine drainage. This would also be the case for Alternatives 2 and 3.

Alternative 1 would have minor adverse effects on air quality, as would all the alternatives, but the effects would not violate any state or federal regulations. Alternative 1, like Alternatives 2 and 3, would comply with the Salmon Forest, Red Rocks Peak Land Use Plan, and with all local, state, and federal laws. Alternative 1 was judged economically feasible for the public sector as no significant demands would be placed on the Forest Service or other public agencies. This effect was similar for all three alternatives.

Long-term restoration and stability was judged greater for Alternative 1 than either Alternatives 2 or 3 because of the location of all facilities in upper Blackbird Creek where soil conditions are better. The water supply reservoir would also provide some protection for the tailings dam, unlike Alternatives 2 or 3, and all diversions for water would utilize open channels which are relatively maintenance free. Public safety on Forest Service roads was judged to have minor improvements for all alternatives because upgrading the Deep Creek - Williams Creek Road would increase

its safety and draw more traffic from other, less safe roads. The transportation and handling of hazardous materials, however, was judged to be a more significant hazard for the implementation of any of the action alternatives. This would be solely a function of increased trips and volumes of materials transported in comparison to past conditions.

Alternative 1 was considered the most technically feasible of the three alternatives. None of the alternatives was considered to have any effect on energy supply or reliability because if power supplies become strained, Idaho Power Company will interrupt power to Noranda to assure reliable power elsewhere. None of the alternatives would have any significant effect on Forest Service programs in range, timber, recreation, or research.

6.4 Evaluation of Alternative 2 - Upper Blackbird Creek Water Reservoir and Lower Blackbird Creek Tailings Impoundment

Alternative 2 would provide different benefits to water quality at abandonment than Alternative 1. The lower site for the tailings dam would provide a benefit by capturing all of the seepage from the existing tailings in the West Fork of Blackbird Creek, but its construction would necessitate a major road relocation and the need for two large diversion structures (tunnels). Its location lower in the drainage means it would be subject to greater flood volumes than the site in Alternative 1 and would thus have a higher potential for adverse effects in the long term. The alternative would have only minor effects on wildlife habitat because of the lower quality of the habitat in lower Blackbird Creek compared with upper Blackbird Creek.

This alternative would cost 24% more to construct than Alternative 1. It would have similar social and economic effects as the other alternatives. Historic resources would be benefited as in Alternative 1. Minor benefits to surface flows at abandonment would occur because the water reservoir would attenuate flood flows, but the benefits at the lower tailings dam site would be less than in Alternative 1 because of the larger drainage area. Groundwater flows and quality would be affected similar to Alternative 1, as would air quality. Only minor benefits to long-term restoration and stability were identified for this alternative, because restoration of areas in lower Blackbird Creek was considered more difficult than in upper Blackbird Creek because of poor soil conditions, and the lower tailings dam would experience greater flood volumes over the long term. The major water diversions would utilize tunnels which would require extensive maintenance at abandonment. Alternative 2 was considered less technically feasible than Alternative 1 because of the large diversion tunnels and increased lengths of pipeline necessary for the alternative. All other criteria were affected the same as Alternative 1.

6.5 Evaluation of Alternative 3 - Lower Blackbird Creek Tailings Impoundment and Water Supply from Panther Creek

Alternative 3 had only minor benefits to water quality during operations because pumping water from Panther Creek had minor adverse effects which partially cancelled some of the benefits of the water treatment plant operation at the mine. Pumping from Panther Creek would mean that flow rates in Blackbird Creek would not be reduced by consumption of upper Blackbird Creek water and dilution flows of Panther Creek would be reduced. The end result was judged as causing somewhat lower water quality in Panther Creek in comparison to Alternatives 1 and 2, but still improved conditions over the past. The somewhat lower quality in Panther Creek was enough, however, for the interdisciplinary team to judge Alternative 3 as not having any potential for improving fisheries in Panther Creek, in contrast to Alternatives 1 and 2. At abandonment, Alternative 3 would have no effect on surface flows in contrast to the flood attentuation benefits of the water supply reservoir in Alternatives 1 and 2.

Alternative 3 would not have any effect on historical resources while Alternatives 1 and 2 would provide benefits. Noranda considered Alternative 3 less technically feasible to construct and operate than Alternative 2 primarily because of the need for another diversion dam, additional pipelines and powerlines to the pumping station and along the entire length of Blackbird Creek, and the major diversions of streams. This alternative would cost 22% more to construct than Alternative 1. All other criteria would be affected in the same manner as Alternative 2.

7.0 IDENTIFICATION OF THE FOREST SERVICE PREFERRED ALTERNATIVE

7.1 The Decision-Making Process

It is the policy of the Forest Service to indicate the agency's preferred alternative in the Final Environmental Impact Statement (FEIS). This preferred alternative, which was selected from the alternatives evaluated in the DEIS document, represents what the Forest Supervisor and the agency's resource specialists feel is the best alternative based upon the analysis of environmental effects utilizing the evaluation criteria.

The method used to identify the preferred alternative required evaluating the alternatives against the significant evaluation criteria covering the environmental effects and values which include the natural sciences, social sciences, political framework, economics, geotechnical considerations, and engineering. All alternatives except No Action were considered to include the implementation of management constraints and mitigation measures discussed in Chapter 4. Each step in the preparation of the draft incorporated the review and comments of the Forest Service specialists. Comments and opinions of agencies and individuals regarding the project were also incorporated into the FEIS.

During the course of the preparation of the FEIS, Noranda modified the proposal presented in the initial "Notice of Intent to Operate," in order to develop a more environmentally sound and economically feasible option. Noranda's conceptual operating plan was filed in December 1979. In consultation with the Forest Service, that plan was modified and submitted formally in March 1980. Preparation of the FEIS started with that 1980 Plan of Operations. During the course of 1980 there was much discussion among Noranda, the Forest Service, and the EIS contractor. These discussions led to further modifications and more detailed analyses, and a third Plan of Operations was submitted in January 1981. Noranda has continued to work with the Forest Service whenever internal and external forces have caused changes in plans. All such changes have been incorporated into the analyses and evaluations presented in this FEIS.

During the evaluation process it was determined that all three action alternatives generally met the constraints of the evaluation criteria. A ranking system was then utilized to weigh the probable effects of the alternatives and to derive the apparent "best" alternative. The concensus of the interdisciplinary team was to recommend Alternative 1 to the Forest Supervisor as the preferred alternative to be presented in the FEIS.

7.2 Specific Factors in the Decision

Alternatives 1 and 2 offered similar benefits in water quality, aquatic habitat, and surface flows. The site for the tailings dam in Alternative 1 (upper Blackbird

Creek) is geotechnically superior to the site in Alternatives 2 and 3 (lower Blackbird Creek). The tailings dam could be safely constructed in Alternatives 2 and 3, but it would be more difficult to achieve a complete seal to bedrock and would be more expensive to construct.

Alternative 3 was determined to be the least environmentally desirable alternative, not because it adversely affected these critical criteria, but because it either had no direct effect, or the alternative required other actions which could have secondary adverse effects (a diversion dam on Panther Creek, new pipelines the entire length of Blackbird Creek, reduced dilution flows). The fact that Alternative 3 was the second most expensive alternative to construct and would have the highest annual operating costs also contributed to its elimination. It was also considered the most technically complex alternative to construct.

The evaluation of alternatives by the interdisciplinary team was important in that as much or more time was spent discussing the effects at abandonment as the effects during operations. This was very critical for water quality, groundwater, surface hydrology, and aquatic resources. During operations, the water reservoir in upper Blackbird Creek could be drawn down to contain high spring runoff and could thus serve the valuable function of attenuating flood flows, as well as offering some flood protection to the tailings dams in Alternatives 1 and 2. At abandonment, the reservoir would still serve to divert water around the tailings dam, and since it is high in the drainage, it would have to divert much smaller volumes than would be the case at the lower tailings dam site. This suggests a much higher potential for long-term stability of the tailings impoundment.

Alternative 1 was considered preferable to Alternative 2 for effects on water quality at abandonment because of the large diversion tunnels necessary for Alternative 2. At abandonment, those tunnels would be abandoned and all stream flow directed through an open channel across the surface of the tailings impoundment. The abandoned tunnels could constitute a significant new source for non-point drainage of groundwater which has the potential of being acidic in nature. Simply avoiding those large diversions tunnels was an important element in eliminating Alternatives 2 and 3.

The recovery of aquatic resources in Panther Creek is dependent on several variables, the contribution of heavy metals from Blackbird Creek being only one. However, any recovery of fisheries in Panther Creek was considered directly related to water quality improvements in Blackbird Creek. All alternatives would improve water quality during operations, but Alternative 1 was considered as having more potential for long-term water quality improvements after abandonment by not requiring the large diversion tunnels and by providing greater geotechnical and hydraulic stability for the upper tailings dam and water reservoir. These effects on water quality should also translate into minor benefits for aquatic habitat in Panther Creek.

Revegetation of disturbed areas also favors Alternative 1. Soils at the site of the upper tailings dam and water reservoir could be salvaged and stockpiled for use in revegetation. Soils are thin and of poor quality at the lower tailings dam site and would not be salvaged.

Finally, the technical feasibility and cost effectiveness of Alternative 1 are superior to the other alternatives. The construction of all facilities in close proximity minimizes the logistics of construction and operations, even though annual operating costs favor Alternative 2. The initial capital costs, which would be the critical element in Noranda's development, are significantly lower for Alternative 1.

8.0 CONSULTATION WITH OTHERS

The Final Environmental Impact Statement for the Blackbird Project was prepared for the U.S. Department of Agriculture, Forest Service, Salmon National Forest (FS) by Environmental Research and Technology, Inc. The Salmon National Forest, as lead agency, has implemented public and interagency consultation and coordination throughout the development of this EIS. The consultation and coordination has included meetings with other federal and state agencies and local government groups, public meetings, and correspondence with concerned interest groups and individuals via a mailing list and periodic newsletters. The following specific activities have taken place as part of this coordination program.

DATE	ACTIVITY
1978	Noranda conducted feasibility study of reopening the Blackbird Mine.
1979	FS worked with Noranda in preparing Environmental Assessments on exploration activities and the pilot project.
1-23-79	Noranda met with state agencies about permits. Represented were Idaho Division of Environment-Department of Health and Welfare, Bureau of Mines and Geology, Dept. of State Lands, Dept. of Fish and Game, Dept. of Water Resources (IDWR) and the U.S. Bureau of Mines. The meeting was held at the Statehouse in Boise.
7-10-79	Noranda filed a Stream Channel Alteration permit from IDWR for the Meadow Creek culvert at 7100'.
8-31-79	Noranda filed their Notice of Intent to Operate with the FS.
9-7-79	Noranda filed for a PSD determination as a new source with EPA.
10-15-79	Noranda filed a Stream Channel Alteration permit with IDWR for the West Fork culvert.
10-17-79	Noranda filed for a Section 404 permit from the Corps of Engineers for disposal of fill materials.
11-14-79	Noranda filed a draft of their NPDES permit with EPA.
12-6-79	Noranda filed for a Special Use Permit with the FS for microwave communication towers.
12-12-79	Noranda filed for a Permit to Construct from IDHW as a new air emissions source.
12-13-79	Noranda filed Stream Channel Alteration permit with IDWR for the Blackbird Creek culvert extension.
March 1980	FS developed a preliminary Scoping Document and environmental checklist.
3-27-80	Noranda filed their formal Plan of Operations with the FS.

4-15-80	Noranda authorized work to begin on the EIS by the environmental contractor.
4-17-80	FS instructed the contractor at the kick-off meeting for the EIS preparation.
4-23-80	FS publicly announced the Blackbird Project and solicited public comments.
5-16-80	An interagency meeting was held in Boise attended by Idaho Division of Environment; Dept. of Health and Welfare, Dept. of Water Resources, Dept. of Fish and Game, Dept. of Lands, and the U.S. EPA.
7-14-80	Noranda signed the Memorandum of Understanding with the FS.
7-30-80	A three-party meeting was held to address the scoping of issues, the EIS schedule, and the EIS study plan
8-20-80	The Notice of Intent to Prepare an EIS and to hold public meetings was sent to individuals and organizations on the FS mailing list.
8-27-80	FS mailed out a Public Involvement Document to agencies and individuals.
9-1-80	FS published the Environmental Assessment of Noranda's pilot project (300 tons per day).
9-5-80	Notice of Intent to Prepare an EIS was published in the Federal Register.
9-5 to 10-5-80	Public comment period.
9-8-80	FS requested list of threatened or endangered species from the Fish and Wildlife Service.
9-22-80	FWS responded to the FS identifying no T&E species of concern in the area.
9-30-80	Public meeting held in Salmon to solicit comments.
10-1-80	Public meeting held in Idaho Falls.
10-1 to 11-1-80	Public comment period.
10-7-80	FWS provided the Forest Service with a list of four candidate threatened or endangered species of plants which may occur.
10-16-80	FS newsletter mailed to agencies and individuals identifying issues from the public meetings.
11-25-80	Three party meeting held in Salmon to discuss scoping, EIS schedule, and draft chapters of the EIS.
12-2-80	FS prepared final Scoping Document with the issues, concerns and opportunities from the project.
1-29-81	Noranda filed updated version of their Plan of Operations, and their Conceptual Reclamation Plan.

2-20-81	Three-party meetings held to address discipline reports and the draft EIS.
3-16-81	FS newsletter mailed out to announce a six-week delay in the EIS schedule.
5-12-81	Interagency meeting held in Boise, attended by EPA, Mine Safety and Health Administration, IDHW, IDWR, and Dept of Lands, Forest Service, and Noranda.
6-4-81	Interdisciplinary Team meeting held to evaluate effects of alternatives and select preferred alternative.
7-24-81	Three-party meeting held to review the PDEIS and incorporate Forest Service and Noranda comments.
8-19-81	Three-party meeting held to review final comments and the camera-ready copy of the DEIS.
9-11-81	Notice of availability for the DEIS published in the Federal Register.
9-11-81 through 11-13-81	Public review period for the DEIS.
10-6-81	Public meeting held in Salmon, Idaho to discuss the DEIS and answer citizen questions.
2-3-82	Three-party meeting held to discuss public comments and incorporate responses and changes into the FEIS.

Many agencies, organizations, and individuals were contacted and have contributed to the preparation of this EIS during the coordination process. The contracts are listed below:

<u>Blackbird EIS Mailing List</u>

<u>Federal Agencies</u>

Dale Dufour	Boise National Forest
Earl LaOrange	Targhee National Forest
Regional Forester	Region 4 Office
Bland Richardson	Intermountain Forest and Range Exp. Station
Will Platts	Intermountain Forest and Range Exp. Station
Gordon Reid	Challis National Forest
Earl Dodds	Payette National Forest
Brad Dodds	Manti La Sal National Forest
Bernice Steinhardt	U.S.D.I. Energy and Minerals
Harry Finlayson	Bureau of Land Management

Paul Pierce, Roy Solderburg	Bureau of Mines, Spokane
Grover Partee	Environmental Protection Agency, Boise
Elizabeth Corbyn	Environmental Protection Agency, Seattle
Wilton Johnson	Bureau of Mines, Washington D.C.
John Moore	Mine Safety and Health Administration
Richard Fisher	U.S. Fish and Wildlife Service
Historic Preservation Advisory Council	U.S.D.I.
Edward Pickering	U.S. Geological Survey
Environmental Project Review	U.S.D.I.
H.G. Wilshire	U.S. Geological Survey
John Ginn	Heritage Conservation and Recreation Service
Bureau of Indian Affairs	Washington D.C.
Asst. Secretary for Environmental Affairs	U.S. Department of Commerce
W.H. Anderson	Army Corps of Engineers
Region 10 Regional Administrator	Federal Highway Administration
Rgional Administrator	U.S. Department of Housing and Urban Developemnt
Planning Director	Pacific Northwest River Basin Commission
Asst. Secretary for Systems Development	U.S. Department of Transportation
Environmental Impact Branch	U.S. Coast Guard
Office of the Acting Director	Water Resources Council
Director Office of Env. Affairs	U.S. Department of Health Education and Welfare
<u>State Agencies</u>	
Mr. Jan P. Blickenstaff	Bureau of Economic Resources and Community Affairs State house, Boise
Richard Schwartz	Idaho Fish and Game Commission
Gordon Hopson	Idaho Department of Health and Welfare
Larry Koenig	Idaho Department of Health and Welfare

Tom Reinecker	Idaho Department of Fish and Game
Kent Ball	Idaho Department of Fish and Game
John Coon	Idaho Department of Fish and Game
Larry Jones	Idaho Department of Lands
East Central Idaho Planning and Development Association	
David Hollingshead	Idaho Department of Water Resources
Idaho Office of Energy	
Paul Castelin	Idaho Department of Water Resources
Gloria Mabutt	Division of Economics and Community Affairs
Merle Wells	State Historical Society
Don A. Olowinski	Deputy Attorney General, State of Idaho
Idaho Bureau of Mines and Geology	
Warren H. Bodily	District Seven Health Department-Salmon

Government Officals

Steve Symms, U.S. Senate

James McClure, U.S. Senate

George Hansen, U.S. House of Representatives

Verle Crystal, State Senator

Ray Infanger, State Representative

John Evans, Governor

Don O'Neil, Lemhi County Commissioner

Louie Demick, Lemhi County Commissioner

Jim Ellsworth, Lemhi County Commissioner

Clyde Rigby, Custer County Commissioner

Bill Cannon, Mayor, City of Salmon

John Blayden, Salmon Chamber of Commerce

Bill Miller, Salmon Chamber of Commerce

Schools

Superintendent of Schools, Lemhi County

Superintendent of Schools, Custer County

Universities

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Bill Kelly, Salmon Planning Commission

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Jack Nelson, Salmon Planning Commission

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Loren Arfmann, Salmon Planning Commission

Jordan Smith, Salmon Planning Commission

Judy Lish, Salmon Planning Commission

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Glen Ford, Salmon Planning Commission

Steve Payne, The Wilderness Society

Stephanie Brady, Idaho Conservation League, Salmon

Russ Thurow, Idaho Conservation League, Salmon

Paul Krupin, Idaho Conservation League, Salmon

Luke Prange, Idaho Conservation League, Salmon

Tribal Chairman, Bannock Tribes

Don Grayot, Lemhi Cattle and Horsegrowers Assn.

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Pete Cole, Audubon Society

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Jim Johnstone, Noranda Mining Inc.

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Greg Hahn, Noranda Exploration Inc.

Terry Webster, Noranda Exploration Inc.

Ann Gardulski, Noranda Exploration Inc.

Maryann Nichols, Noranda Exploration Inc.

Giesla Toth, Noranda Exploration Inc.

Michael J. Parks, Marples Business Newsletter

J. D. Kelland, Chevron

A. C. Melting, David S. Robertson and Assoc.

Richard C. Mulready, Pratt and Whitney

Northwest Mining Assoc.

Republic Geothermal Inc.

Maxine Wiber, Noranda Mines Ltd.

Harry Noah, OTT Water Engineers

Lie Trunen, Continental Minerals

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Dennis Trumble, Idaho Power Co., Salmon

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Bill Powell, KUPI Radio, Idaho Falls

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Jim Caples

Terry Gilman

Kate Kelly Huber

George Hyde

Renaldo Jensen

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Gary Marshall

Joe McAllen

Johnnie O'Conner

Don Shaefer

Sandy Sims

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Dave Sandersfield

Derrold Slavin

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GLOSSARY

Acre-foot - The amount of water necessary to cover one acre to a depth of one foot, equaling 43,560 cubic feet.

Adit - A horizontal passage driven into a mine from the side of a hill.

ADT - Average daily traffic.

Alluvial deposit - A general term for unconsolidated material deposited during comparatively recent geologic time by a stream or other body of running water.

Ambient conditions - Existing environmental conditions found in the study area before being affected by Noranda's activities.

Benthic - Refers to organisms that live on or occur at the bottom of streams or bodies of water (see also Macroinvertebrates).

Biological oxygen demand (BOD) - The amount of dissolved oxygen required to meet the metabolic needs of microorganisms in water rich in organic matter.

Chemical oxygen demand (COD) - The amount of dissolved oxygen required to oxidize various chemicals found in water.

Colluvial deposits - Loose deposits of angular rock fragments transported to the foot of a slope or cliff by gravity.

Community infrastructure - government provided support facilities such as police, fire, water, sewers, and schools.

Concentrator - A plant where ore is separated into concentrates and tailings.

Cumulative Impact - The impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period or time.

Cyclone classifier - A device to separate by centrifugation fine and coarse particles suspended in water.

Decibel (dBA) - A unit for expressing the relative intensity of sound weighted to achieve close approximation to the human hearing spectrum. Scale from zero for the average least perceptible sound to about 130 for the average pain level.

Dip - the angle at which an ore vein is inclined from the horizontal.

Drift - A horizontal passage driven parallel to the course of an ore vein.

Ephemeral stream - A stream that flows only briefly during and following a period of rainfall in the immediate vicinity.

Epicenter - The point on the earth's surface directly above the focus of an earthquake.

Flocculation - The gathering of suspended particles into aggregations to accelerate settling.

GLOSSARY (CONTINUED)

Foundation cutoff - A wall or other structure intended to reduce the percolation of water through porous rocks.

Froth flotation - The separation of finely crushed minerals by causing some to float in a froth created in water by reagents and air and others to sink to the bottom of the tank.

Fugitive dust - Any dust particles which become airborne other than those being emitted by a stack or chimney.

Grout curtain - An area into which grout (cement) has been injected to form a barrier under a dam through which groundwater cannot seep or flow.

Headframe - A steel or timber frame located at the top of a shaft, which carries hoisting cables and pulleys.

Historical conditions - Environmental conditions which have existed in the study area since extensive mining operations were begun in the early 1950s, but prior to Noranda's rehabilitation of the mine site and construction of the water treatment plant.

Hydrostatic bulkhead - A water tight plug constructed in a shaft or adit.

Impact - The results of an action on the environment; the impact may be primary (direct) or secondary (indirect).

Impingement - The trapping of aquatic organisms against a water intake structure.

Infiltration - Movement of water through the soil surface into the ground or from the ground into a sewer pipe.

Macroinvertebrates - Small animals such as insects and worms which live in or on the bottoms of streams and are visible without a microscope. In the Noranda studies the macroinvertebrates were collected by two methods: surber samplers were used to collect those forms that burrow or live in soft substrates, and Hester-Dendy multiplate samplers were used to collect those that live on vegetation or rocks. The multiplate sampler is an artificial substrate on which the organisms establish themselves over time.

mgd - Million gallons per day.

Non-point discharge - The discharge of water or air pollutants which cannot be isolated to a specific source.

Patented mining claim - A claim to which surface title has been secured from the federal government.

Piezometer - An instrument for measuring water pressure head.

Periphyton - Simple plants which grow on rocks or other substrates is a stream.

Permeability - The measure of the capacity for transmitting a fluid through a substance.

pH value - The degree of acidity (or alkalinity) of water or soil.

Portal - An entrance into a mine.

Precipitate - A substance separated as solid particles from a liquid as the result of a chemical or physical change.

Prevention of Significant Deterioration (PSD) - Regulations mandated by the Clean Air Act and designed to prevent significant deterioration of existing air quality (not related to health) through three concentration limit categories: Class I - essentially no deterioration, Class II - minimal deterioration, Class III -the maximum allowed deterioration but still less than the National Ambient Air Quality Standards.

Raise - A vertical or inclined opening driven upward from one level in a mine to connect with the level above.

Reagent - A chemical or solution used to produce desired characteristics for froth flotation.

Recharge - The process by which water enters the ground and reaches the water table.

Seismicity - The phenomena of earth movements.

Slimes - A material of extremely fine particle size encountered following ore treatment.

Stope - An area from which ore has been excavated in a series of steps.

Strike - The direction or bearing of the longitudinal axis of an ore vein or structural plane.

Tailings - The refuse material resulting from processing ground ore.

Talus - A sheet of coarse rock fragments covering a slope below a cliff.

Total Suspended Particulates (TSP) - All pollutants in the air that are in solid form (versus gaseous or liquid form). Most TSP is common dust.

Unpatented mining claim - A claim to which title has not been received from the federal government. These claims are subject to annual assessment work in order to maintain ownership.

Water table - The upper limit or surface to which the ground is totally saturated with water. This level may be very near the ground surface or many feet below it.

Winze - A vertical or inclined excavation connecting two levels in a mine.

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APPENDIX A

LIST OF PREPARERS

The individuals listed below had primary responsibility for conducting the environmental studies, preparation of the technical reports, and development of the EIS. Their education, project responsibilities, qualifications, and experience are summarized below.

USDA, Forest Service, Salmon National Forest

James C. Lancaster, District Ranger, Cobalt Ranger District

B.S. in Forest Science, Colorado State University
Blackbird Project: Responsible for overall direction of the preparation of the EIS.
Experience includes 12 years of work with the Forest Service in minerals, timber, recreation, and land use management.

Thomas M. Buchta, Project Coordinator

B.S. in Forest Soils, Stephen F. Austin State University
Blackbird Project: Primary liaison person between the Forest Service, ERT, and the applicant. Responsible for study design and EIS review and content; authored several sections in the EIS.
Experience includes 11 years of work with the Forest Service in forest soils and minerals management.

Environmental Research & Technology, Inc.

Dehn E. Solomon, Program Manager

B.A. in Biology, Kalamazoo College; M.S. in Biology, Texas Christian University
Blackbird Project: Responsible for supervision of all discipline studies; coordination with applicant and government agencies, and regulatory compliance; one of primary EIS authors.
Experience includes management of environmental studies and development of environmental impact analyses for two proposed gold mines, a copper smelter, crude oil pipelines, transmission lines, and a power plant.

Gary D. Uphoff, Assistant Program Manager

B.S. and M.S. in Zoology, University of Nebraska
Blackbird Project: Responsible for ERT, Forest Service, and applicant coordination; one of the primary EIS authors.
Experience includes design, organization, and management of environmental studies for power plants; coal, oil shale, and hard rock mines; utility corridors; and cooling reservoirs.

Andrew C. Ludwig, Assistant Program Manager

B.S. and M.S. in Zoology, M.S. in Resource Planning and Conservation, University of Michigan
Blackbird Project: Responsible for EIS review and editing, technical and clerical staff coordination, and assigned project management activities.
Experience includes technical and management activities on federal EAs and EISs for coal mines and transportation systems, a dam and reservoir, transmission lines and pipelines, an oil shale mine and retort, and a power plant.

Valerie J. Randall, Program Coordinator

B.A. in Urban Studies, Briarcliff College, Minor in Geography-Cartography
Blackbird Project: Responsible for coordination of EIS, technical reports, and NEPA regulatory compliance; one of primary EIS authors.
Experience includes development of three EA/EISs for the Forest Service and BLM for hard-rock mining projects. Additional experience includes coordination of environmental reports for pipelines, reservoirs, and an oil shale project.

Charles M. Bosley, Water Resources Engineer

B.S. in Civil Engineering, Colorado State University; M.S. in Hydraulic Engineering, Colorado State University.
Blackbird Project: Analysis of surface hydrology data and senior author of the Surface Hydrology Technical Report.
Experience includes collection, organization, and analysis of surface hydrology data; predictive runoff analysis and hydrologic design; and fluvial modeling and bank stabilization design.

Patrick H. Davis, Water Quality Scientist.

B.S. in Agriculture, New Mexico State Univeristy; M.S. and PhD. candidate in Fisheries and Wildlife, Colorado State University.
Blackbird Project: Responsible for surface water quality data collection and analysis, water quality modeling, and aquatic toxicology impact assessment; author of the Water Quality Technical Report.
Experience includes extensive water quality and aquatic toxicology analyses with the Colorado Division of Wildlife.

Ron Sutton, Aquatic Ecologist

B.S. in Fishery Biology, Colorado State Univeristy; M.A. in Zoology, Southern Illinois University.
Blackbird Project: Responsible for preparation of the Aquatic Ecology Technical Report; conducted field reconnaissance, literature search, and interviews with applicant and government agencies to gather information for the report.
Experience includes developing and implementing environmental assessments pertaining to aquatic resources for crude oil pipelines, coal-to-gasoline plants, power plants, and oil shale plants.

James W. Duncan, Wildlife Ecologist

B.S. in Wildlife Management/Forestry, West Virginia University.
Blackbird Project: Responsible for review of all available literature and interviews with state wildlife officials; prepared the Wildlife Technical Report and wildlife sections used in the EIS.
Experience includes field surveys for wildlife and vegetation and project and/or discipline management responsibilities for projects in over 15 eastern and western states. Completed projects concerning transmission lines, pump storage reservoirs, nuclear power plants, oil shale projects, and coal mines. Specialist in field surveys, impacts analysis, and mitigation plans for wildlife.

Scott L. Ellis, Plant Ecologist

B.A. in Biology and English, Cornell University
Blackbird Project: Responsible for environmental studies of vegetation and threatened or endangered plant species. Senior author of the Vegetation Technical Report.
Experience includes design and management of vegetation surveys and reclamation plans for proposed surface and underground mining projects and pipelines; development or publication describing threatened or endangered plant species in Colorado for the USDI, Fish and Wildlife Service; design and performance of surveys for threatened or endangered plant species at proposed industrial sites and along proposed transmission/pipeline corridors.

Douglas B. Greer, Soil Specialist

B.S. in Range Ecology, Colorado State University
Blackbird Project: Collected and analyzed soils information. Primary author of the Soils Technical Report.
Experience includes conducting Order Three soil surveys, preparing reclamation plans and environmental analyses, and analysis of toxic wastes hazards; discipline manager on several large mining projects.

Joel T. Ferrill, Senior Air Resource Scientist

B.S. in Chemical Engineering, University of Colorado; graduate studies in Chemical Engineering at the University of New Mexico and in Atmospheric Science at Colorado State University.
Blackbird Project: Responsible for supervision and preparation of the Air Resources Technical Report.
Experience includes management and performance of air quality studies for coal mines, a gold mine, three mine-mouth oil shale operations, four mine-mouth coal-fired power plants, one geothermal power plant, and two gas-sweetening plants.

Janet J. Skinner, Senior Planner

B.A. in History and M.A. in Social Sciences, California State College, Fullerton.
Blackbird Project: Responsible for design and implementation of the socieconomic study, including liaison and coordination with local government agencies and planning officials. Senior author of the Socieconomics Technical Report.
Experience includes planning and implementation of numerous socieconomic studies related to energy development projects.

Bernhard E. Strom, Senior Planner

B.S. in Urban Planning, Iowa State University; M.C.R.P. in City and Regional Planning, Harvard University.
Blackbird Project: Responsible for coodination of human resources discipline (visual resources, noise, land use, transportation, and socioeconomics), review and editing of technical reports, and writing and editing portions of the EIS.
Experience includes conducting and managing human resources envicronmental assessments for energy and mineral development projects, pipelines, transmission lines, and transportation projects.

Patrick Tierney, Associate Planner

B.S. in Environmental Science and Biology, Northern Arizona University; M.S. in Natural Resource Management, Colorado State University.
Blackbird Project: Compiled and analyzed housing, transportation, land use, recreation, and other data. Coauthor of Socioeconomics Technical Report.
Experience includes project and discipline managment of socioeconomic studies related to western energy and mineral development, as well as recreation resource planning.

ESA Geotechnical Consultants

W. Roger Hail, Hydrogeologist

B.S. in Geological Engineering, University of Nevada
Blackbird Project: Conducted modeling and analysis of the groundwater system in the area of the Blackbird Mine; primary author of the Groundwater Technical Report.
Experience includes comprehensive groundwater studies, foundation studies for tailings dams, and evaluations of surface and groundwater contamination from mine drainage and tailings ponds.

Mark Zuber, Hydrogeologist

B.A. in Environmental Studies, University of California, Santa Barbara; M.S. candidate in Environmental Geology, Colorado State University.
Blackbird Project: Conducted analysis of groundwater hydrology and contributed to the Groundwater Technical Report.
Experience includes interpretation of borehole logs and identification of regional geologic hazards for local land use planning.

Noranda Mining Inc.

James Johnstone, Site Manager

Graduated with degrees in Mining Engineering from the University of Glasgow and the Royal College of Science and Technology
Blackbird Project: Responsible for overall management of the Blackbird Project. Supervises operations, maintenance, and staff activities in relation to the project development. Provided considerable project information and comments to the EIS.
Experience includes work with Doornfentein Gold Mining Company in South Africa and Kilembe Cobalt-copper Mines Limited in Uganda for six years. Worked for Craigmont Mines Limited in British Columbia, Canada for nine years holding various positions in engineering and mine operation, ultimately being the mine Superintendent.

Brent C. Bailey, Environmental Engineer & Project Coordinator

B.S. and M.S. in Civil Engineering, University of Utah.
Blackbird Project: Responsible for securing and maintaining various permits for the Blackbird project; serves as liaison with government agencies. Supervises and develops water quality monitoring programs at the project. Primary Noranda contact for EIS.
Experience includes a broad range of engineering projects and environmental concerns including wastewater treatment facilities, solid waste management, and air quality.

Gary Montin, Manager, Environmental Affairs

B.A. in Biology, New College (Florida)
Blackbird Project: Provided review and comment on EIS and technical reports and participated in the IDT meeting.
Experience includes serving as environmental project manager on several mining and land development projects; has been involved in many permitting activities including the preparation of several environmental impact statements.

Maxine Wiber, Environmental Scientist, (NML, Toronto)

B.S. in Chemistry, York University, Toronto
Blackbird Project: Established water quality and biological monitoring programs for Blackbird Project. Provided assistance in securing initial permits for the project. Served as Noranda contact person for EIS.
Experience includes establishing air and water quality monitoring programs for various Noranda mining, milling, smelting, and refining projects. Has served as liaison to governmental agencies.

Stephen G. Peters, Senior Geologist

B.S. in Geology, Northern Arizona University; M.S. in Science Management, University of Alaska
Blackbird Project: Responsible for supervision of all mine geology activities at the Blackbird Mine. Primary author of the Geology Technical Report.
Experience includes regional experience in prospecting and exploration for various commodities in Western U.S., Norway, and Alaska; mine geology in Rhodesia, South Africa, and Idaho.

APPENDIX B

COMPLIANCE SCHEDULE ORDER

BEFORE THE IDAHO BOARD OF HEALTH AND WELFARE

In the Matter of Noranda Mining Inc. Blackbird Mine - Cobalt, Idaho	)))))))	Docket No. 80-6 Stipulation for Entry of Compliance Schedule Order Idaho Code §39-116

Milton G. Klein, Director of the Department of Health and Welfare, by and through John J. Hockberger, Jr., Deputy Attorney General and Noranda Mining Inc. (hereinafter referred to as Noranda) by and through their acknowledged representative, hereby cooperate and agree on the selection of terms for the following compliance schedule order designated as Attachment "A" to this stipulation. The purpose of the order is to provide a mechanism that is acceptable both to Noranda and to the Board of Health and Welfare for monitoring and regulating the effects of mining activities conducted by and for Noranda and its assignees in the Blackbird Mining District. Noranda reserves the right to appeal or to seek an evidentiary hearing as to any portion of an order finally issued which is not identical with Attachment "A".

The parties to this stipulation agree that the following facts are true and may be considered by the Board of Health and Welfare when considering entry or modification of the order.

1. The Blackbird Mining District is located in east-central Idaho near Salmon, Idaho. (See Exhibit I) The Blackbird Mine, initially discovered in 1893, was the principal mine in the district. Metal deposits in the form of cobalt and copper sulphides were mined and milled by various operators at the Blackbird Mine from 1917 to 1967, with the main period of extraction from 1949 to 1967. Commercial mining activities ceased in 1967.

2. Mining in the district was conducted through both open pit and underground operations. The existing environmental prob-

lems have been caused by acidic flows from the old mine workings, metals leaching from waste piles, and lean ores deposited in the Blackbird and Meadow Creek stream channels. Meadow Creek is a tributary of Blackbird Creek and Blackbird Creek is a tributary of Panther Creek. There has been severe degradation of water quality in all three streams.

3. After securing mineral rights in the district from previous mine owners and operators Noranda conducted a feasibility study that suggested reopening the Blackbird Mine. Following consultation with the Department of Health and Welfare, Division of Environment, Noranda developed a plan for simultaneously reopening the Blackbird Mine and improving water quality in affected streams. At the present time both the waters of Blackbird and Meadow Creeks contain concentrations of heavy metals and acids greatly in excess of "Water Quality Standards and Wastewater Treatment Requirements" §§ 1-2199.02, 1-2250.04, Title I, Chapter 2, Idaho Department of Health and Welfare Rules and Regulations. The first phase of the plan, as set forth in the attached Exhibit "A", is projected to decrease heavy metal concentrations in Blackbird and Meadow Creeks. Acidity in both creeks may also be substantially reduced.

4. The actions contemplated by the Noranda plan are recognized by all parties to be environmentally desirable. In a good faith effort to comply with the Idaho Environmental Protection and Health Act of 1972 and the regulations promulgated thereunder, Noranda hereby voluntarily and willingly agrees to be bound by the following lawful order of the Board of Health and Welfare, issued under authority of Idaho Code § 39-116, without formal notice, hearing, or any other procedure provided by Idaho Code §§ 39-108 and 67-5201, et seq.

DATED this 25th day of September, 1980.

John J. Hockberger, Jr.
JOHN J. HOCKBERGER, JR.
Deputy Attorney General

DATED this ____ day of September, 1980.

AUTHORIZED REPRESENTATIVE OF
NORANDA MINING INC.

BEFORE THE BOARD OF HEALTH AND WELFARE

In the Matter of	)	Docket No.
	)	
Noranda Mining Inc.	)	Compliance Schedule Order
	)	Idaho Code § 39-116
	)	
Blackbird Mine - Cobalt, Idaho	)	

WHEREFORE, upon the foregoing stipulation of the parties in this matter, which is incorporated by reference as a part of this order, the Board of Health and Welfare identifies the following acts and time schedule for their completion as appropriate and desirable for Noranda Mining Inc. (hereinafter referred to as Noranda) to safeguard water quality in conformity with "Water Quality Standards and Wastewater Treatment Requirements", Title I, Chapter 2, Idaho Department of Health and Welfare Rules and Regulations. It is recognized, however, that prior natural and man-caused conditions will limit the extent to which certain streams can attain specific instream water quality standards contained in the aforementioned Water Quality Standards, Rules and Regulations.

IT IS HEREBY ORDERED AND THIS DOES ORDER:

I

MINIMIZE POLLUTION FROM NEW MINING ACTIVITIES

Noranda shall at all times control and treat the discharge of pollutants from any new or in service adits in accordance with the requirements of applicable NPDES permits. Noranda shall employ all practicable measures to prevent pollution of surface or ground waters from new waste of any sort.

II

ADIT WATER TREATMENT

By November 1, 1980, Noranda shall begin treating mine portal water in accordance with the requirements of the applicable NPDES

permit from the 7400, 7200, 7100, and 6850 foot levels as designated on the map appended hereto as Exhibit I.

LII

DIVERSION CULVERT

By October 15, 1980, Noranda shall install a culvert to isolate the surface water flow of Meadow Creek away from the 7100 foot waste pile.

IV

WATER QUALITY MONITORING -

By October 15, 1980, Noranda will begin an ambient water quality monitoring program on Blackbird Creek and Panther Creek to aid evaluation of past and present mining impacts. The raw data shall be submitted quarterly to the Division of Environment.

V

BIOLOGICAL MONITORING

Noranda has completed a biological monitoring program for 1980. Noranda will submit the results of that program by May 1, 1981. In addition, Noranda will conduct a biological sampling program as follows:

1. Benthic samples will be taken from Panther Creek at two stations; one above and one below the confluence of Blackbird Creek.

2. The samples specified in paragraph 1 will be taken in April, August and November of 1981 and in April, August and November the next two years if requested by the Division of Environment.

3. The samples will be classified by order.

4. The results will be submitted to the Division of Environment by May 1 following the end of each year's sample program.

VI

MINESITE SEWAGE TREATMENT

Noranda shall construct domestic sewage treatment facilities at the Blackbird minesite by December 1, 1980. The plans and specifications for those facilities must be approved in advance of construction by the Pocatello Regional Office of the Division of Environment. These facilities shall be operational by December 31, 1980.

VII

COBALT TOWNSITE SEWAGE TREATMENT

Noranda shall construct domestic sewage treatment facilities at the Cobalt townsite by October 31, 1980. The plans and specifications for those facilities must be approved in advance of construction by the Pocatello Regional Office of the Division of Environment. These facilities shall be operational by October 31, 1980.

VIII

STREAM CHANNEL CLEAN-UP

Noranda shall remove all trash and debris from the stream channels of the Blackbird Creek drainage within its patented mining boundaries by December 31, 1981. Trash and debris shall mean all man-made objects and excludes mining or processing waste.

IX

NONPOINT SOURCE POLLUTION STUDY

By July 1, 1982, Noranda shall initiate a three-year study of the nonpoint source pollution problems within the Blackbird Creek drainage. The study will attempt to address all sources of heavy metals and acidity in Blackbird Creek. Each source will be described in terms of location, causes of contaminated flows and, where possible, total heavy metal loading. Noranda will include

proposals to reduce the impacts of these sources where possible, according to a reasonable schedule.

Annual progress reports including identification of the areas investigated, pollution problems encountered, and possible solutions to those problems shall be submitted to the Division of Environment by May 1, following the previous year's work. A final report to be submitted by May 1, following the end of the third year's study will summarize all the information gathered and articulate the best economically feasible control strategy for those problem areas that are not under control at that time. A time schedule for implementing that control strategy shall be included in the final report.

X

FORCE MAJEURE

If any event occurs which causes or may cause delay in the achievement of any requirement under this order, Noranda shall notify the state in writing within 20 days of the day Noranda knew or should reasonably have known of the event, describing in detail the anticipated length of the delay, the precise cause or causes of the delay, all of the anticipated consequences of the delay, the measures taken and to be taken by Noranda to prevent or minimize the delay, and the timetable by which those measures will be implemented. Noranda shall adopt all reasonable measures to avoid or minimize any such delay. Such excusable delay shall include, but not be limited to, acts of God, war, accident, strikes or lockouts, and delays caused by failure to obtain necessary governmental approvals, permits or authorizations.

If the parties agree that the delay or anticipated delay in the achievement of any requirements of this order has been or will be caused by circumstances beyond the control of Noranda, the

parties shall stipulate to the extension of the particular compliance requirement affected by a period not exceeding the delay caused by such circumstances. The burden of proving that any delay is caused by circumstances beyond the control of Noranda shall rest with Noranda.

XI

EFFECT OF COMPLIANCE WITH THIS ORDER

Compliance with this Order and with the issued National Pollutant Discharge Elimination System permit during their terms constitutes compliance, for purposes of enforcement, with the "Water Quality Standards and Wastewater Treatment Requirements", Title I, Chapter 2, Idaho Department of Health and Welfare Rules and Regulations.

XII

REVISION OF THIS ORDER

With the agreement of the Idaho Department of Health and Welfare, Division of Environment, Noranda may, at any time, revise any completion date, report submittal date and may terminate or modify the frequency of any of the water quality and biological studies or any other item contained in this Compliance Schedule Order.

XIII

TERM OF THIS ORDER

This Compliance Schedule Order shall remain in effect until:

1. All items contained herein are completed; or,

2. All mining operations cease. Mining operations exclude exploratory drilling and related activities. Exploration consists of activities to define potential ore bodies rather than activities to produce ore.

IDAHO BOARD OF HEALTH AND WELFARE

ATTEST:

Secretary to the Board

COMPLIANCE SCHEDULE ORDER, page 6
(Attachment "A" to Stipulation)

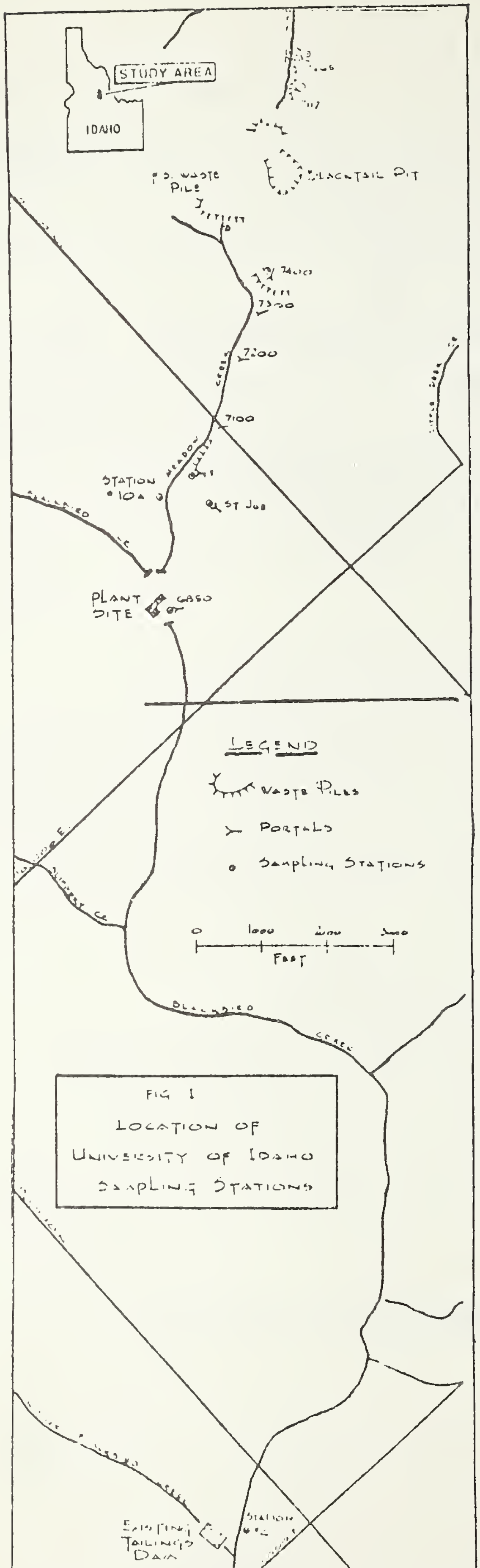

FIG 1
LOCATION OF
UNIVERSITY OF IDAHO
SAMPLING STATIONS

EXHIBIT "I"

APPENDIX C

CONCEPTUAL RECLAMATION PLAN

CONCEPTUAL RECLAMATION PLAN
BLACKBIRD PROJECT
COBALT, IDAHO

NORANDA MINING, INC.
P. O. Box 39
Cobalt, Idaho 83229

January 1982

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FIGURES

INTRODUCTION

This Reclamation Plan has been prepared by Noranda Mining, Inc. and represents an outline of reclamation activities for areas that will be impacted by the proposed mining operation at the Blackbird Mine as well as limited reclamation of existing disturbed areas. Specifically, these plans are oriented to mitigating effects on topography, road access, vegetation, water quality and visual character. It should be noted that reclamation of the site has already begun and will not end until after the mining phase of the project is complete.

This document presents a brief overview of the existing environmental setting of the site, project description, current operation, and proposed methods of rehabilitation. A detailed discussion of the project site and the impacts which could result from development of the mine is presented in the Environmental Impact Statement and associated technical appendices.

SITE CHARACTERISTICS

The Blackbird Project is located in East-Central Idaho, forty-two miles by road from Salmon, Idaho. The Blackbird ore zone was first discovered in 1893. Mineral deposits in the form of cobalt and copper sulphides have been mined and milled intermittently at the Blackbird mine site since 1917 by various operators. A significant period of extraction occurred from 1949 to 1967 where both underground and open pit mining methods were utilized.

The visual characteristics of the area are typical of those found within the Northern Rocky Mountains. Deep canyons and narrow valley floors accompanied by varied rockforms, waterforms, and vegetation create high quality scenery. Vegetation in the area consists of Englemann spruce, subalpine fir, Douglas fir, lodgepole pine, aspen, and cottonwood. Previous mining activities are evident from occasional waste dumps. Water contributes positively to the narrow valley floor's visual characteristics. Streams in the area flow at diverse velocities, causing interesting variety. Structures dominate the view where past mining activity has occurred. These include buildings, platforms and retaining walls. Forms are generally blocky and create contrast with the surrounding pyramidal countryside (1).

The past mining activity has led to the degradation of localized drainage at the mine site which in turn has affected the downstream water quality and aquatic habitat. Prior to the commissioning of a water treatment plant constructed at the site, Blackbird Creek exhibited turbidity along most of its length below the mine site. This has since changed to a clear running stream, with occasional brown sediments in quieter pools.

Informantion on the nature of the water quality at the Blackbird mine site can be found in a University of Idaho Study, by J. A. Baldwin, et.al, conducted from 1974 to 1976 (2). Baldwin showed that a major source of metal loading, principally iron, copper and cobalt into Meadow Creek and Blackbird Creek was from the mine drainage. Waste piles at the head of and along Meadow Creek were also identified as contributors of poor quality water. Of significance was the metal loading in Blackbird Creek that could not be traced to a specific source, called non-point source loading (2).

PROJECT DESCRIPTION

Noranda Mining, Inc., proposes to reopen the Blackbird Mine to produce cobalt and copper concentrates. Presently known geological ore reserves, indicate that the mine can be developed with a production rate of 1200 tons per calendar day for a minimum of 12 years. This production rate will be gradually developed over a period of 5 years.

The Blackbird ore body will be mined using underground mining methods. The rock types require a "filling" method such as cut-and-fill. Backfill material will be produced from mill tailings and where possible, mine development waste. A shaft will be sunk from surface to approximately the 6000 foot elevation to provide access to the lower levels of the ore body.

As mentioned, development waste rock will be used as backfill where possible; excess waste rock will be deposited on existing waste piles near the mine portals or on the downstream slope of the tailings dam.

Noranda's proposal includes a new shaft and service complex rehabilitation and expansion of the existing concentrator to process approximately 1200 tons per day. In conjunction with this, it is proposed to locate a new tailings dam in the upper Blackbird Creek valley, upstream from the existing mine yard. Also, Noranda proposes the construction of a freshwater reservoir in upper Blackbird Creek, upstream from the proposed tailings impoundment area.

New facilities such as repair shops, administration offices, change house, warehouse and other services will be located

around the shaft. Existing structures will be utilized where possible.

Roads connecting Cobalt with Salmon will require improvement to ensure adequate safety levels for the anticipated increase in traffic.

CURRENT OPERATIONS

In September 1980, Noranda secured through an Environmental Assessment, a permit to operate the Blackbird facilities at 300 tons per day. This pilot operation has included mine development, mining, upgrading the concentrator, milling ore, and various site improvements. These improvements along with other site improvements initiated in 1979 have generally improved the aesthetics of the project area and the opportunity for improvements in water quality. To date, the following measures have been completed:

* debris and iron scrap were removed from the stream channels on patented land along Blackbird and Meadow Creek and from the plant area below the 7400 foot elevation.

* a culvert was installed to isolate the flow of Meadow Creek from the waste pile at the 7100 foot level.

* mine water flow from the 7400 foot portal was diverted to the 6850 foot level for treatment.

* a mine water neutralization plant was constructed and commissioned during the month of December 1980.

* a sanitary waste water treatment facility was installed for the Cobalt town site.

* several rundown houses were removed and the sites cleared.

* two sanitary waste water treatment plants were installed at the mine site.

* the mine yard has been extended and a sedimentation pond constructed and placed in operation. All drainage from the 6850 plant yard area is directed to this pond.

The water treatment plant was constructed to reduce iron loading in Blackbird Creek. Based on metal loadings developed from the data collected from J. A. Baldwin, et.al, it was estimated that approximately 75 percent of the iron loading can be removed as a result of collection and treating the mine drainage flows. However, reductions in copper and cobalt levels, that originate from existing waste dumps and non-point sources would not be significantly influenced by the water treatment plant.

On an overall basis, water quality is showing improvements. Sampling by the Forest Service shows that the range of pH values in Blackbird Creek below the mill gate has increased from 3.1-5.4 in 1979 to 5.2-6.4 in 1981; suggesting a significant reduction in acidity. At the same time, the range of values for copper concentrations has dropped from 13.5 - 1.6 mg/l to 7.7 - 0.3 mg/l. In Panther Creek below Blackbird Creek, the range in copper concentrations has dropped from 0.038 - 0.190 mg/l to 0.038 - 0.092 mg/l (1979 to 1981) (8).

To deal with the water quality issue and to gain a greater understanding of the situation, Noranda is conducting a water quality survey, biological monitoring (three times per year in 1981 and again in 1982 and 1983 if requested by the Division of Environment), and a non-point source study (for a three-year period starting July, 1982). These programs are a part of the Compliance Schedule Order negotiated by Noranda and the State

of Idaho Division of Environment and represent a cooperative effort to define the water quality issues. This investigation should provide a greater understanding of the problems, and will aid in updating the reclamation plan.

RECLAMATION APPROACH

Goals and Objectives

There are two primary goals for reclaiming the Blackbird site:

* Revegetation of disturbed surfaces
* Prohibit further degradation of water quality

Significant surface disturbances that will result from the Blackbird Project include new roads, tailings impoundment, freshwater reservoir, waste dumps and borrow sites. All of these areas except the waste dumps and the clay borrow site at Forney, are on public lands, and all will be reclaimed. Existing at the site are waste dumps and surface disturbances from previous mining operations. Reclamation of these areas is not included as part of this reclamation program. As previously mentioned, poor water quality in Blackbird Creek has been related to pre-Noranda mining operations. Restoring water quality to pre-mining (i.e. circa 1880) conditions is a monumental task and considered outside the scope of the reclamation program; but preventing further degradation is possible and one of Noranda's goals.

Objectives that will be pursued to meet these goals are:

* return affected areas to as near normal contour and vegetational composition as possible,
* stabilize surface disturbances to reduce movement and erosion of soil, and
* construct reclamation improvements for minimal maintenance.

Reclamation is an on-going process and will be influenced by changing technology and conditions at the site. The goals, objectives and methods are based on the best understanding of these aspects at this time. Throughout the life of the project, these will be refined and improved.

Methods

General

The general procedure that will be followed for reclaiming the Blackbird Mine is as follows:

1. Close and seal the mine to limit access and control mine drainage.
2. Remove or alter the manmade facilities.
3. Engage in site preparation such as:
   a. grade, shape and contour the surfaces to be reclaimed.
   b. improve the physical properties of the growing medium, using such methods as ripping, furrowing, or adding topsoil or mulch.
   c. improve the chemical properties of the growing medium by isolating or neutralizing toxic materials.
4. Stablize the area and improve the aesthetics by revegetation and/or providing rip-rap.
5. Monitor the areas of reclamation. Specific concerns will be erosion and animal damage.

If during this last step any problems are encountered, corrective action will be taken. Any rills and gullies will be filled and

graded and then revegetated. Deer browsing on newly revegetated areas may require the use of spray repellant.

As mentioned, it will be necessary to improve the properties of the growing medium before a successful revegetation program can be undertaken. One method is to apply topsoil to the surface. Recognizing this as a possible method for the proposed Blackbird Project, Noranda will strip the topsoil from the tailings impoundment area and any permanent fresh water reservoir sites in upper Blackbird Creek and place it in stockpile. The amount of available topsoil is limited and will require careful allocation. Priority locations (in descending order) will be the tailings impoundment surface, waste rock areas, grading for demolished buildings and structures and grading for any road abandonment.

Suitable storage areas are available in upper Blackbird Creek. These areas will allow placement of the material with a slope angle ranging from 25° to 30°. These slopes should allow stable storage of the topsoil; but berms and benches will be employed if determined necessary. Protection against erosion will be achieved with the use of vegetation or erosion netting.

Current Technology

Reclamation of the Blackbird Mine has received considerable attention in the past. In conjunction with this, research has been conducted at Blackbird to determine methods and plant species that would work best for the waste dumps created from previous surface mining activities (3,4,5). This research has been conducted since 1972 and has primarily focused on methods for amending and seeding the historical spoil areas. This work has yielded a "current technology" and every effort will be made to utilize this information.

The application of current technology will involve preparation of the site by contouring, grading, preparation of the surface for planting and selection of the proper plant species for revegetation. Contouring and grading will take into consideration the surrounding topography and the surface drainage. Drainage channels will be constructed to divert flow away from waste dumps. Prior to planting, topsoil (if available) will be spread over the surface and/or the surface material will be tested for liming and fertilizer requirements. The selection of a seed mixture will depend on actual site conditions, i.e., slope, aspect, size. Reports of the studies conducted at Blackbird discuss the various mixtures that have been utilized on the mine site to date (4). These mixtures contain both native and introduced species. Certain introduced species establish quickly and provide organic matter to the soil and thereby produce suitable conditions for establishment of native grasses.

Conifer tree planting will also be attempted in areas suitable for this type of revegetation. It is anticipated that lodgepole pine (Pines Contora) will be primarily used in the reforestation efforts due to its dominance in the project area. Soil competition may be a problem for the newly planted conifer tree stock. To deal with this, raisin tray paper may have to be utilized. This paper is commonly used in drying grapes in California and has been successfully used on forest confier tree planting sites. When planting the two-year old seedlings, the paper (cut into 2' x 2' squares) is slit and put on the ground around the seedling stem. Three or four surface rocks are placed on the papers to hold them down.

Experimental Approach

During the operation life of the mine, new technology for mine reclamation is expected to evolve. If these new methods prove feasible for the Blackbird Project, alternative reclamation

methods will be proposed to the appropriate regulatory authorities for consideration.

Past reclamation research at the Blackbird site was primarily related to the waste dumps. Development of methods will be necessary for the tailings impoundment. Noranda will utilize as much as possible of what is currently known, but some additional research work will be required to establish procedures that are suitable to the tailings area. This research effort will take place during the life of the mine and will be oriented to developing surface improvements and species selection.

Selection of plant species for the tailings area will be a critical task. Species will be selected from the strains that are specifically adapted to the climate and topographic conditions of the Blackbird drainage.

AREAS OF RECLAMATION

General

The following sections discuss the various areas of the project that will be reclaimed and outline the programs that will be employed.

In general terms, the area disturbed by the proposed mining operation will be reclaimed by restoring a number of features to near natural conditions. The visual character of the site will be enhanced by removing all processing facilities and buildings, contouring the site where possible and revegetating. Activities to discourage degredation of water quality will include sealing the mine to eliminate portal discharges and reduce or eliminate the flow of air into the mine and the production of acid waters. Reclamation and revegetation of new waste dumps and tailings areas will also promote better water quality.

During the mine life, water quality and biological surveys will be conducted to aid in the evaluation of the impact of the mining program.

Mine

The mine consists of the underground workings that will be developed for the extraction of cobalt-copper ores. The primary reclamation activity for this area will be to seal access to the mine. The objective of sealing the mine is to control the amount of air entering the mine workings which will limit the production of acid water.

During the operating years, mining methods using backfill will be employed. Mine waste rock and coarse tailings mixed with cement

will be used to fill the mined areas. As mentioned, backfill is a mixture of coarse tailings and cement. Mixture ratios vary with the conditions in the mine and the material being milled but usually runs about 20 to 1 (tailings to cement). The material, once "set" has a relatively low permeability. The areas that will be backfilled are the stopes; most drifts will remain open to facilitate access for men, equipment and ventilation. This mining method will effectively reduce the areas of the mine that are directly exposed to air, thereby minimizing the potential for the production of acid mine water drainage.

During the life of the mine, all diamond drill holes will be plugged. This safety measure will also reduce any flows encountered by drilling.

It is recognized that there are many aspects to mine drainage that must be considered to implement an effective sealing program. Optimization of effort can be realized by fully understanding the nature of the problem. As part of Noranda's reclamation effort, an on-going study conducted or coordinated by on-site personnel, will be performed during the life of the project. Areas of high drainage will be noted, flows measured and other sealing programs will be studied. This should allow judgment as far as the necessity and location of interior, intermediate bulkheads, diversion measures, and grouting programs.

Tailings Area and Freshwater Dam

These areas consist of the proposed tailings dam, tailings impoundment area, and freshwater dam and reservoir. The specific objectives for the tailing impoundment area are to provide:

* improvements that will enhance the stable containment and storage of tailings and allow eventual dewatering.

* a reclaimed area that allows uses that are compatible with Forest Service goals and operations criteria.

* a surface that will sustain the growth of vegetation.

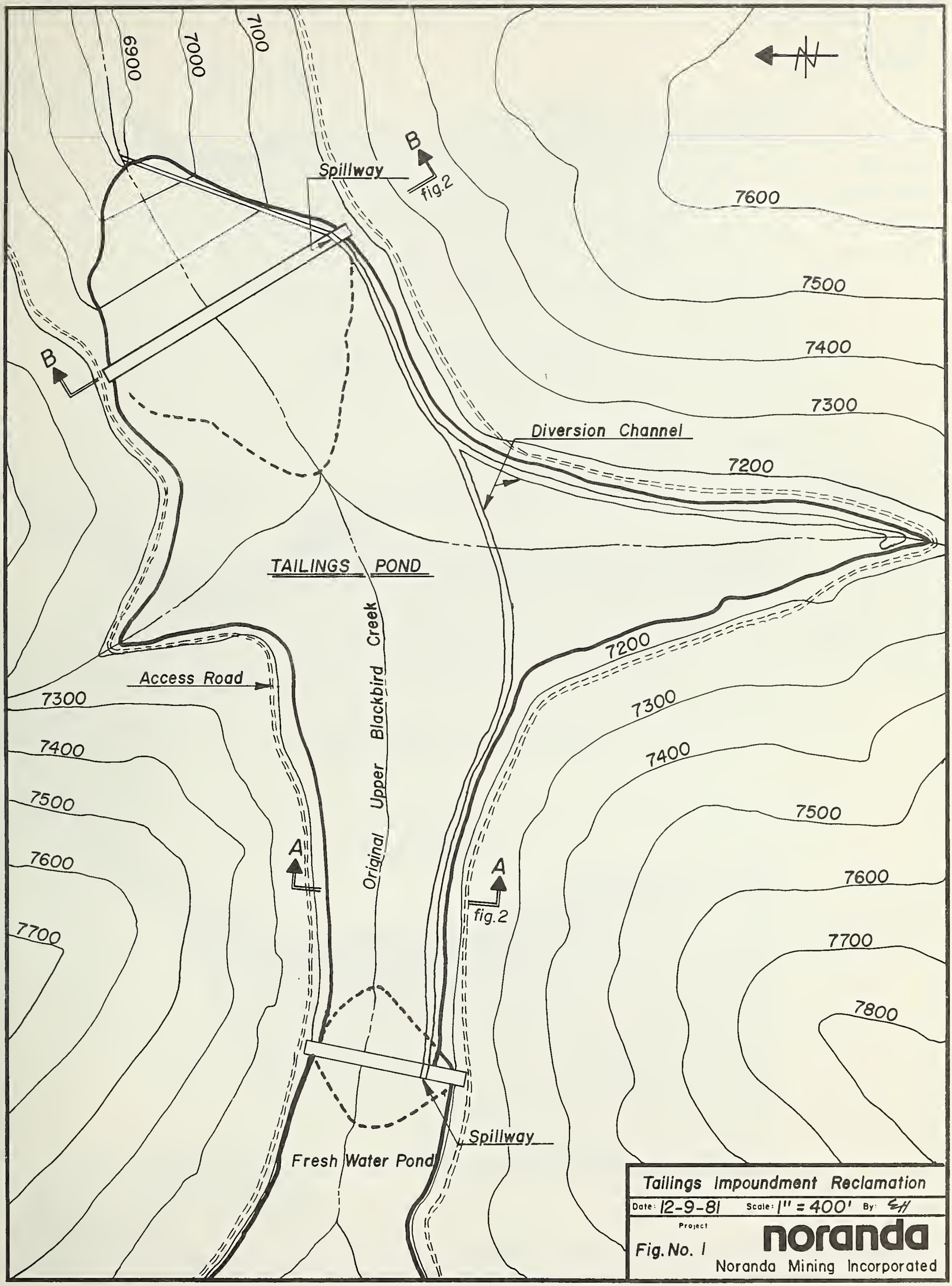
* a diversion system which will safely isolate streamflows from tailings material on a long-term maintenance-free basis.

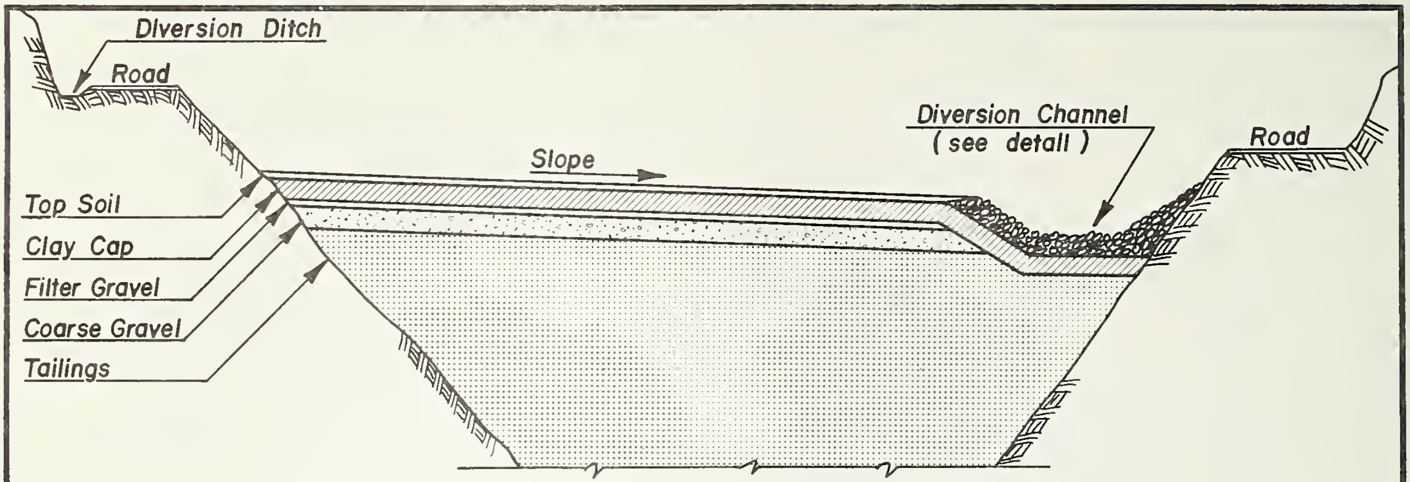
Reclamation of the tailings impoundment will begin when mining and milling has ceased and the area is sufficiently stable to support heavy equipment. Reclamation efforts will consist of a surface water diversion system, surface preparation and re-vegetation.

It is possible that the tailings will continue to dewater for several years after operations cease. This seepage will be analyzed for its effect on water quality. If it is determined to be detrimental, it will be collected at the toe of the tailings dam and pumped back into the impoundment. It may be necessary to construct a small, temporary pond on the tailings surface to hold these waters.

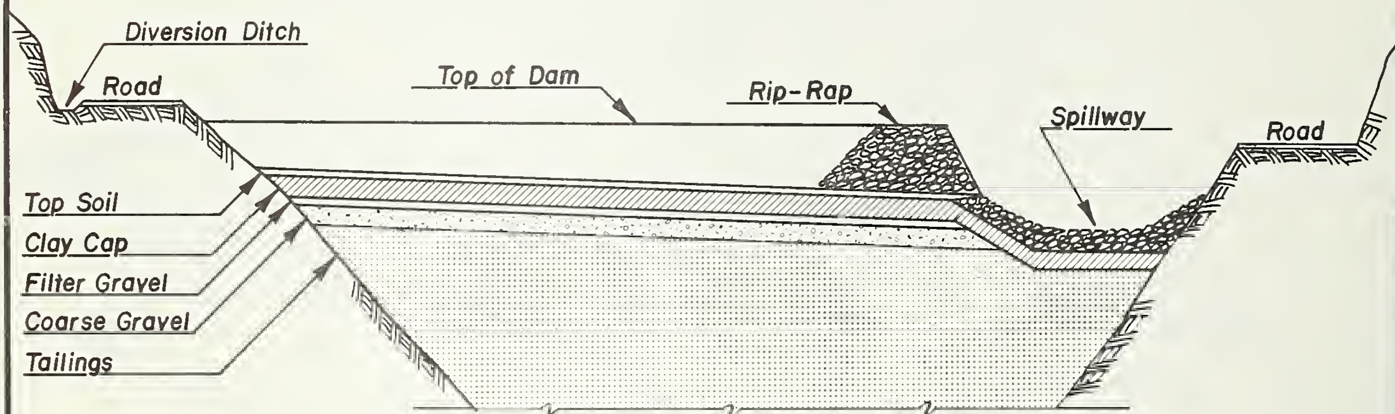
On abandonment, the surface water diversion system for Blackbird Creek will consist of a diversion structure at the freshwater dam, a diversion channel across the tailings and a spillway down the face of the dam (see Figure 1 and 2). The details of the permanent diversion structure at the freshwater dam will depend upon

MONSEN ENG. 500 9-80 MC1550•

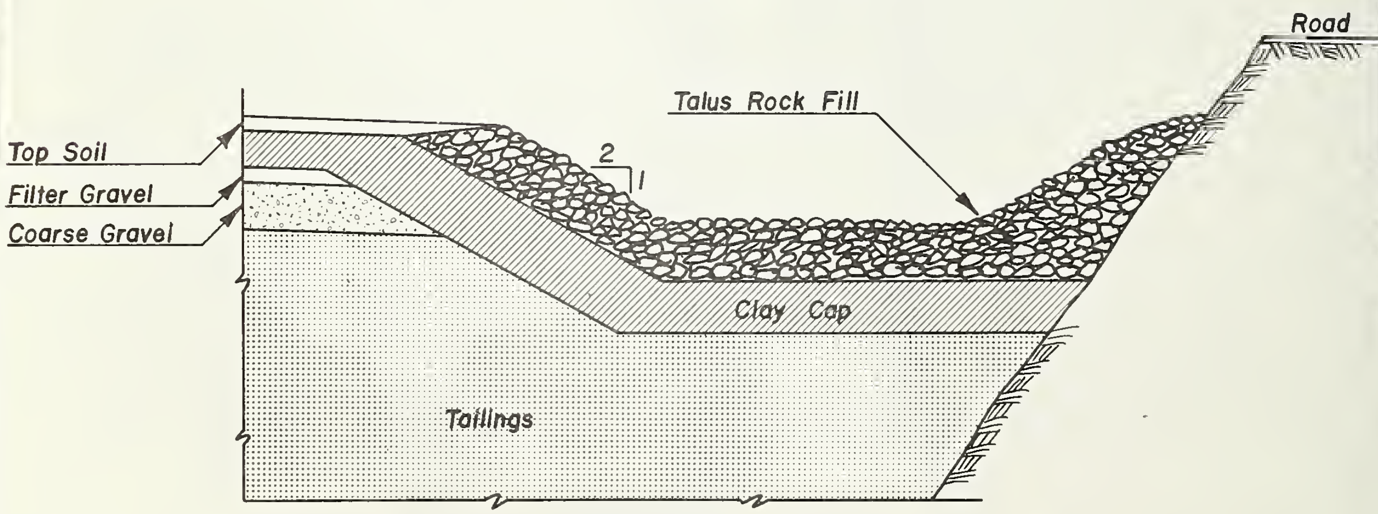




TYPICAL SECTION (A-A)
(fig. 1)



SECTION AT DAM (B-B)
(fig. 1)



DETAIL OF DIVERSION CHANNEL

Note: Vertical Scale Exaggerated to Illustrate Structure of Clay Cap

Tailings Impoundment Reclamation

Date: 12-81 Scale: nts By: EH

Project

Fig. No. 2

noranda

Noranda Mining Incorporated

the final use chosen for the dam and reservoir. The diversion channel will be placed on one side of the impoundment area where the tailings surface meets the adjacent mountainside. The spillway will be placed in a parallel position on the dam face, i.e., the groin of the dam.

Construction of the diversion channel will be enhanced by sloping the tailings surface to the diversion channel. This can be facilitated by placing the tailings outfall lines and dispersion points along one side of the tailings impoundment and feeding towards the other. Deposition of the tailings will form a natural slope. The profile of the diversion channel will be designed with sufficient slope to minimize sediment deposition and will be rock lined to prevent erosion of the tailings.

The spillway will be a continuation of the rock lined diversion channel but will require larger rock to reduce water velocity and insure channel stability. Approximately three feet of dam freeboard will be provided to contain any flows that exceed the capacity the diversion channel and ensure that no runoff occurs over the downstream face. The shoulder of the dam at the spillway will be constructed with rip-rap to protect it.

All of the diversion structure will be designed in accordance with criteria of the Idaho Department of Water Resources and the Forest Service.

It should be recognized that diversion plans at this stage are conceptual in nature and may be altered as site-specific design information is developed and reviewed. The plans and drawings presented are best viewed as examples which could meet the goals outlined on page 16.

Revegetation of the tailings will follow construction of the diversion channel. The approach to revegetation that Noranda proposes for this area is to employ an experimental/developmental program with a second program based on current technology as a fall-back alternative. This "current technology" approach was previously discussed in the "Reclamation Approach" section.

Research work on revegetating tailings areas has involved neutralizing the surface or covering it with glacial till and identifying species that will grow in this environment (6). Some success has been realized but more work is needed. Noranda's program will be to pursue these experimental methods, to check their applicability to Blackbird. This will allow flexibility and may result in new and improved methods.

If the experimental program produces methods that are impractical to implement on a large scale basis then an alternate program based on current technology will be followed. This program will essentially consist of covering the tailings with a clay cap followed by revegetation. The first step would be the application of coarse rock of sufficient size and thickness to prevent the upward migration of moisture and/or leachate from the tailings. The next step would be the placement of a filter gravel that would be followed by the clay cap. The filter gravel is required to prevent the clay from washing into the coarse rock. The clay and coarse rock system would help prevent the migration of surface moisture into the tailings and upward movement of any moisture that may be residual in the tailings. It should also increase the amount of moisture available for plant growth (see Figures 1 and 2).

The final step in this alternative program is revegetation. This will consist of covering the clay with previously stockpiled topsoil (taken from the impoundment during the initial construction phase). Planting of the proper grasses and shrubs will be based on the methods outlined in the section on "Reclamation Approach".

Reforestation will also be attempted on the tailings area.

Reclamation efforts for the freshwater dam and reservoir will depend upon the program selected by the Forest Service. Several options exist. First, the dam could be breached to the level of the impounded tailings. (The impounded tailings will abut against the freshwater dam, making it necessary to leave a portion of the dam in place.) The second option is that the dam and reservoir could be left in place and used for recreation. The final configuration will depend upon Forest Service decisions prior to construction.

If the fresh water dam is breached, the earthen material in the dam will be spread over the tailings impoundment as part of the reclamation effort for that area. Topsoil in the area behind the freshwater dam will have been left in place and can now be vegetated with grasses to stabilize the exposed banks and discourage erosion. (This can easily be done with a hydromulcher.) Present plans allow for the diversion structures at the head of the reservoir to be demolished and removed to allow the natural surface drainage to return to the original channel and across the tailings structure. It is likely that a small pond will remain as a result of the remaining truncated dam. Alternatively, the diversions could be left in place. This would permit stream diversion around the tailings impoundment during all but a 100 year storm event. This latter option will not be maintenance free and would require maintenance which has to be negotiated.

If the dam is left intact, then diversion structures will be demolished and removed to allow the flows from Blackbird Creek to run uninterrupted into the reservoir. The diversion ditches constructed around the reservoir during the initial construction phase and used for controlling the water surface during the mining period will be filled and revegetated. Unless otherwise

directed by the Forest Service, structures and equipment for withdrawing water will be inactivated and/or demolished and removed. Topsoil from below the water reservoir will have been stripped and stored and can now be used to resurface other disturbed areas.

Waste Rock Areas

Mining and mine development will result in the production of waste rock. This material will have a size ranging from silt to approximately 18 inches. It will be removed from the underground mine workings and used for construction material, backfilled into mined out sections of the mine, or deposited at extablished waste rock disposal areas.

During the mine development stage, waste rock will be used in the tailings dam construction. During the operating phase of the mine, much of the waste rock will be used in increasing the dam height. Waste rock that can not be utilized in the dam construction will be stored. Presently, it is projected that this will occur at three active portals: 7080, 7250 and 7410. Total estimated area of this waste rock disturbance is approximately 4.5 acres which is approximately four percent of the area that has been previously disturbed.

The three sites currently identified for waste rock disposal are suitable for this purpose and will be designed for a sidehill fill configuration; they will be constructed to provide a safe and stable structure for reclamation. Design will take into consideration placement methods, material gradation, petrography, density, durability, moisture content, foundation characteristics, groundwater and surface hyrology (7).

Considerable effort will be made to control moisture in the waste rock dumps. Surface waters will be diverted away from the sites. Diversion channels on the up slope side of the storage sites will be constructed to divert snow melt and runoff around the areas. If waste pile embankment slopes intercept existing stream beds, new channels will be excavated to prohibit waters from contacting the waste rock material.

After mining is complete or the specific waste rock area is retired, it will be contoured and prepared for revegetation activities. Revegetation will be performed as outlined in the section for "Reclamation Approach".

Access Roads

Upon abandonment, roads no longer utilized by the mining program or required by the Forest Service will be closed, graded to blend into the surrounding topography (ditches filled and shoulders rounded, and vegetated). Existing culverts will be maintained until the vegetation has established itself well enough to prevent excessive erosion at which time they will be abandoned.

Specific roads to be closed will be identified in Noranda's operating agreement with the Forest Service.

Buildings and Ancillary Facilities

All buildings and ancillary facilities will be removed when mining ceases. Where possible, foundations will be demolished and removed. It is anticipated that some of the concrete walls and slabs will be too massive and will therefore be made safe and left in place (particularly under the mill). For those foundations that are removed, the void will be filled, graded and vegetated.

CITED REFERENCES

(1) PAULSEN, Merlyn; STROM, Bernie;

"Visual Resource Technical Report for the Blackbird Project"; Environmental Research and Technology, Inc., Fort Collins, Colorado; August 1981.

(2) BALDWIN, Joe A., RALSTON, Dale R., TREXLER, Bryson D.;

1978, "Water Resource Problems Related to Mining in Blackbird Mining District, Idaho".

(3) RICHARDSON, Bland Z.,

"Reclamation of Acid Producing Spoils on a Western Surface Mine", 1980.

(4) FARMER, Eugene E. and RICHARDSON, Bland Z.,

"Acid Mine Waste Revegetation: Influence on Soil Water Quality"; Research Paper INT-266, Intermountain Forest and Range Experiment Station, U. S. Department of Agriculture, January, 1981.

(5) FARMER, Eugene E. and RICHARDSON, Bland Z.;

"Test of Methods for Amending and Seeding Spoils at the Blackbird Mine"; Research Paper INT-265, Intermountain Forest and Range Experiment Station, U. S. Department of Agriculture, January, 1981.

(6) Canadian Land Reclamation Association, Sixth Annual Meeting, Cranbrook, B.C.; August, 1981. Cominco Ltd. Sullivan Mine at Kimberly B. C. has experimented with liming of tailings since 1978.

(7) VANDRE, Bruce C.;

"Tentative Engineering Guide: Stability of Non-water Impounding Mine Waste Embankments", U. S. D. A. Forest Service, Intermountain Region, March, 1980.

(8) HENNES, Robert, Forest Hydrologist, Salmon National Forest; Graphs of data presented on a field tour for the Idaho Conservation League; June 1981.

APPENDIX D

DRAFT EIS PUBLIC COMMENTS AND RESPONSES

The Draft EIS was released to government agencies, private organizations, and interested individuals on September 11, 1981. The official deadline for submission of comments on the Draft was November 13, 1981; however comments received after that date are included in this Final EIS. Comments to the Draft and the associated responses are included on the following pages.

LETTER A

2810
1950

IDAHO STATE HISTORICAL SOCIETY
610 NORTH JULIA DAVIS DRIVE BOISE, IDAHO 83706

STATE MUSEUM

September 15, 1981

Mr. Richard T. Hauff
Forest Supervisor
Salmon National Forest
Salmon, ID 83229

Dear Mr. Hauff:

RE: DEIS Blackbird Cobalt-Copper Project

We have received the DEIS for the Blackbird Cobalt-Copper Project. Our concern is the protection of archaeological and historic properties in the project area. **1** Our interests have been adequately dealt with in the DEIS and we have no substantive comments. We do recommend that the three cabins located be evaluated as to their eligibility for the National Register of Historic Places as soon as possible.

Sincerely,

Thomas J. Green

Thomas J. Green
State Archaeologist
State Historic Preservation Office

TJG/kmh

COPY
P.C.

LUP	1	2	3	4	5	6
TM	1	2	3	4	5	6
	1	2	3	4	5	6
ENG.	1	2	3	4	5	6
R-WL	1	2	3	4	5	6
A.O.	1	2	3	4	5	6
CIWA	1	2	3	4	5	6

Sent to DT 9/17/83

RESPONSE TO LETTER A

A-1 The Forest Service has evaluated the three cabins in upper Blackbird Creek and made a preliminary determination that the sites are eligible for nomination to the National Register of Historic Places. The consultation and mitigation process is proceeding under Section 106 of the National Historic Preservation Act of 1966.

LETTER B

Blackbird EIS 1950 2810

United States Department of the Interior

BUREAU OF MINES

WESTERN FIELD OPERATIONS CENTER
360 EAST 3RD AVENUE
SPOKANE, WASHINGTON 99202

SALMON N.F.
COPY
P.C.

September 16, 1981

SEP 2 1 '81

LUP	1	2	3	4	5	6
TM	1	2	3	4	5	6
	1	2	3	4	5	6
ENG.	1	2	3	4	5	6
R-W/L	1	2	3	4	5	6
A.O.	1	2	3	4	5	6
CIWA	1	2	3	4	5	6

sent to D-T 9/22

Mr. Richard F. Hauff,
Forest Supervisor
Salmon National Forest
Salmon, Idaho 83467

Subject: Review of Draft Environmental Impact Statement (DEIS)
Blackbird Cobalt-Copper Project
Salmon National Forest

Dear Mr. Hauff:

The following comments are the result of an informal review and are proffered for technical assistance only. A formal review must be requested through our Washington headquarters office.

Most of the DEIS appears adequate and reasonably well documented. We note only one serious flaw. Except for those minerals to be mined as part of the current plan, the DEIS ignores and fails to address the question of minerals resources. Unfortunately, this flaw is typical of the approach to mineral resources in mining EIS's. The equivalent, in terms familiar to the Forest Service, is "failure to see the forest for the trees." In some future project great damage might be inflicted upon the "other" mineral natural resources of a project area because of failure to properly address the question. We do not necessarily suspect this problem for the Blackbird project, but as a minimum we believe specific answers should be provided for the following questions:

1

1. Are there any known or suspected mineral resources of possible future economic interest beneath or immediately adjacent to the old mill tailings or the mill tailings site for alternatives 2 and 3? If the answer is yes, what will be likely impacts upon future development of those mineral resources if project alternative 2 or 3 is implemented?

2. Are there any known or suspected mineral resources of possible future economic interest beneath or adjacent to the fresh water reservoir site and mill tailings storage site on upper Blackbird Creek? If yes, what will be likely impacts upon future development of those mineral resources if project alternative 1 or 2 is implemented?

RESPONSE TO LETTER B

B-1

Noranda has made a preliminary investigation of the tailings disposal area for Alternatives 2 and 3 and has found traces of cobalt, but not in sufficient quantity to suggest that a significant mineralized zone exists there. It has been concluded that the lower Blackbird Creek option for tailings impoundment does not cover any significant cobalt mineralization.

Preliminary investigations of the upper Blackbird area indicate that there is a good chance of copper-cobalt mineralization in that area. Diamond drilling and detailed exploration has not taken place; and exploration potential for near-term economic mineralization is negligible.

If, at some future date, it is determined feasible to mine these areas, a mine development program would involve leaving sufficient pillars to protect the impoundment areas. This would be accomplished by leaving pillars of ore unmined, however, such pillars would tie up only a small tonnage of the potential mineralization.

2

3. Are there any known or suspected mineral resources of possible future economic interest beneath or immediately adjacent to the proposed new waste rock disposal sites on figure 4-2? Again, if the answer is yes, what will be the impacts of the proposed project on future development of these mineral resources?

Sincerely,

R. N. Appling, Jr.

B-2

The proposed new waste rock disposal sites are directly over the main Blackbird ore body but will not interfere with future development of this mineral resource. The primary ore blocks have been identified and are best accessed through underground mining methods. The waste rock disposal sites will not hamper these operations.

LETTER C

281C

State of Idaho
DEPARTMENT OF WATER RESOURCES
STATE OFFICE, 450 W. State Street, Boise, Idaho

JOHN V. EVANS
Governor

A. KENNETH DUNN
Director

Mailing address:
Statehouse
Boise, Idaho 83720
(208) 334-4440

October 6, 1981

RE: Comments on Draft EIS - Blackbird Cobalt - Copper Project

Richard T. Hauff
Forest Supervisor
Salmon National Forest
Salmon, ID 83467

Dear Mr. Hauff:

This office has reviewed the above referenced draft EIS and has the following comment:

Specific Comment

1 1. Page iv - Alternative 1

The water reservoir should not be allowed to store water after abandonment due to periodic maintenance requirements.

2 2. Page 1-4 - 1st paragraph

Blackbird and Big Deer creeks contain few fish but the remainder of the Panther Creek drainage is listed by the Idaho Fish and Game Department as a "Class 11 Fishery" (high priority fishery resource).

3 3. Page 2-11 - 2nd paragraph

Copper is not the most toxic of the heavy metals. The sentence should be reworded.

4 4. Page 4-9 - 2nd paragraph

The word "particle" usually depicts fine grained material not generally in the 2-18 inch size. Perhaps it should be changed.

5 5. Page 4-21 - 1st paragraph

Hydrologic data would be helpful in evaluating dams, diversions, and channels.

6 6. Page 4-26 - 4th paragraph

See first comment.

RESPONSE TO LETTER C

C-1 At this time the EIS indicates that Noranda will abandon the structure to meet the requirements of the Forest Service. The State has similar review and approval requirements which will be coordinated with the Forest Service when site-specific engineering design is submitted.

C-2 The situation in the Panther Creek drainage is more completely described in Chapter 2 of the FEIS. The Class II designation is undoubtedly based on the pre-mining aquatic resources in Panther Creek which included an anadromous fishery as well as a good resident fishery. At the present time however, only Panther Creek above Blackbird Creek remains unaffected by the heavy metal pollution which has eliminated that anadromous fishery and severely limited the aquatic system in lower Panther Creek.

C-3 The text has been reworded to indicate that copper was determined to be the limiting factor for aquatic life in Panther Creek.

C-4 The text has been reworded.

C-5 This information is available in the Surface Hydrology Technical Report. The Boise National Forest has copies of all the technical reports for review.

C-6 Please see response C-1.

7 7. Page 4-36 - 4th item

Restoration of stream channels should be included in the paragraph.

8 8. Page 5-6 - 1st paragraph

See first comment.

General Comment

9 Applications to appropriate the public waters of the state must be submitted to IDWR for any use of water.

Plans and specifications for construction of any water storage dams or mine tailing impoundment structures must be submitted to IDWR for review and approval prior to construction.

Any work in below the mean high water mark on a continuously flowing stream must be approved by IDWR through the stream channel protection application process.

Sincerely,

L. Glen Saxton

L. GLEN SAXTON
Operations Bureau Chief

LGS:alw

C-7 "Affected stream channels" has been added to the list described.

C-8 Please see response C-1.

C-9 General comments - These items have been added to the Management Requirements and Constraints section of the FEIS.

LETTER D

2810

STATE OF IDAHO

DEPARTMENT OF HEALTH AND WELFARE

DIVISION OF ENVIRONMENT
Statehouse
Boise, Idaho 83720

COPY
P.C.

OCT 8 '81

October 5, 1981

Richard T. Hauff, Forest Supervisor
Salmon National Forest
Region 4 - USDA Forest Service
Salmon, ID 83467

Dear Mr. Hauff:

The Division of Environment, Department of Health and Welfare, has reviewed the Blackbird Cobalt-Copper Project draft EIS. Our general impression is that the document is well prepared and quite thorough. We also agree with the selection of Alternative 1 as the most environmentally sound.

Our more specific comments are:

	Page	Comment
1	V	Alternative 3 would result in "...somewhat lower water quality in Panther Creek...." and we do not regard that as a "minor benefit" as stated.
2	1-7	Since the Idaho Bureau of Air Quality no longer exists, air quality concerns would have to be addressed by EPA-Seattle and their contractor, Engineering Science.
3	2-14	The DEIS states that "A more precise estimate of (copper-loading reductions) is not possible at this time...." because of limited flow and copper loading data at various important sampling locations. Has Noranda or their contractor tabulated all available water quality data from the project area? If so, and if the data still is not available, why has Noranda failed to collect it? They have been active onsite since 1978; that surely allowed sufficient time to gather the necessary information.
4	2-20	The extent to which the United States must rely on "uncertain sources" for its cobalt supply has been widely questioned. The attached article by Mr. Scott Reed addresses that specific issue.

EQUAL OPPORTUNITY EMPLOYER

RESPONSE TO LETTER D

D-1 The EIS is correct in characterizing these benefits relative to the other alternatives and the baseline water quality conditions for the project.

D-2 The change has been made in the FEIS.

D-3 The topic discussed here, reduction in copper loading, is due to the operation of the water treatment plant. The plant began operation in December of 1980 and was fully operational in the spring of 1981, the same period during which the DEIS was being written. Data collected during operation of the plant in 1981 were used to update the Water Quality Technical Report and the DEIS (page 5-13).

D-4 As noted, the importance of the United States' dependence on historically unstable countries for its cobalt supply has been debated. The real significance of the issue lies in the fact that cobalt is a strategic metal, for which the United States depends on foreign sources for 93 percent of its supply (latest Bureau of Mines mineral commodity summaries).

Re: Noranda EIS
Page 2
October 5, 1981

	Page	Comment
5	2-25	Table 2-6 is misleading due to the explosive growth recently experienced in Challis. The text addresses that issue, but the table still indicates a 3.3% decrease in population, etc. Perhaps another column with estimated December 1981 populations could be added.
6	3-2	Significant #5 Criterion is moot since any alternative enacted will result in cobalt production. As stated above, our dependence on foreign sources is not as significant as some may purport. This should not be a significant alternative and, in fact, precludes the No Action alternative from consideration. One page before the DEIS states that each criterion was chosen so as to not eliminate any alternative.
7	3-2	We feel that items 14 and 17 should be elevated to the level of "Significant Criteria".
		Note: None of these comments from Page 3-2 would change selection of the preferred alternate.
8	4-7	Sixteen hundred gallons of sludge per day would be pumped from the treatment plant to the sludge basin for storage and dewatering by *infiltration and evaporation* (our italics). If that material is 5% solids, they will infiltrate nearly 1500 gallons per day of high-metal-content water. That water passes through a soil matrix and enters the "groundwater" regime around the buried culvert. What are the loadings to, and impacts upon, the groundwater from that 1500 gpd seepage? Is that now, or will that be a significant impact, and is such impact acceptable?
	4-16	We applaud the inclusion of interception structures on surface level tailings lines, assuming the structures are designed in such a way that they can intercept leakage or broken pipe wastes, and dispose of them properly.

D-5 The purpose of the table is to show multi-year trends from the most recent 1970-1980 data base. A footnote will be added to clarify the existing situation in Challis.

D-6 This criterion is valid since the EIS must consider a no action alternative and display the issues, concerns, and opportunities developed during the scoping process. As noted in the response to comment D-4, a 93 percent dependence on foreign sources of supply for a strategic metal is significant irrespective of any conclusion as to whether that source is reliable or not.

The statement you refer to on page 3-1 has been revised in the FEIS. A more accurate descripton is that alternatives are not excluded from consideration because they do not satisfy all of the criteria listed.

In response to the comment that any action alternative will result in cobalt production, please refer to Table 6-1.

D-7 Because of the very close connection between the groundwater and surface water flows in the Blackbird Creek drainage, regional transport of groundwater beyond the immediate surface drainage basin was assumed to be negligible. For this reason the Forest Service felt that water quality impacts on surface water were most significant (criterion #1).

The distinction between criteria 17 and 11 is based on the relative importance of the area or facility to be reclaimed, For example, stabilization of a component such as a water reservoir or tailings dam was determined to be of greater significance than a disturbed area such as a borrow site, road, etc. The Forest Service believes this is an important distinction that was brought out during the scoping process for this project and other similar mining projects.

D-8 The 1,600 gallons per day figure is an ultimate rate of production which will occur only during the full-scale operation of the mine. During full-scale operation, the sludge will be pumped to the tailings dam, and the sludge pond will be abandoned and reclaimed. The operation of the sludge pond was covered in the Environmental Assessment for Noranda's pilot operation. The approval for that facility was based on information which indicated that the high density (not low density) sludge would not infiltrate to any significant degree but would dewater, and that water would be the same quality as that discharged from the treatment plant. The Forest Service will continue to monitor the effects of this facility through its sampling of Blackbird Creek.

Re: Noranda EIS
Page 3
October 5, 1981

	Page	Comment
9	4-25	One piezometer does not appear to be enough for seepage monitoring from a tailings dam. How will groundwater be separated from seepage, or will <u>all</u> intercepted water to a certain depth be pumped back into <u>the</u> impoundment?
10	4-25	When the tailings impoundment is covered and sealed after abandonment, what will happen to Blackbird Creek water which was formerly diverted around this structure?
11	4-36	With reference to item #2, topsoil stockpiles should be built according to good engineering practice, and should be stabilized to prevent erosion.
12		With reference to item #3, if <u>any</u> "pollution hazards" are created during construction or operation, they should be controlled. The phrase "significant unforeseen hazards" places too much responsibility on people to decide which hazard to treat.
13	4-36, 37	We did not see mitigations for leaking tailings dams, broken slurry pipes, spilled materials - in general for the myriad of accidents possible in the construction and operation.
14	5-8	What data were used to generate an annual average suspended sediment in Blackbird Creek of 500 mg/l? Also, what mitigations and control activities will Noranda undertake to minimize the 100 mg/l annual average increase? State water quality standards specify that nonpoint source activities must be carried out in accordance with best management practices. Can we be assured best management practices are being followed if 600 mg/l suspended sediment is flowing down Blackbird Creek?
15	5-13	The assumption that NPDES concentration limits would remain the same and loadings increased is not valid. If a permit were issued for 400 gpm, and flow increased to 900 gpm, new limits would be negotiated based on industry guidelines for that process.

D-9 The wording has been changed in the FEIS to indicate that instrumentation to monitor potential seepage from the tailings dam will be determined by the Forest Service and the Idaho Department of Water Resources after evaluating the detailed engineering design for the structure. Because of the nature of the ground water system (see response D-7), this monitoring will likely stress surface water quality measurements in addition to possible deep well monitoring. The preliminary design of the seepage control dam employs a positive cutoff to intercept all seepage.

D-10 At abandonment, upper Blackbird Creek will flow through a diversion, as described in the Reclamation Plan (Appendix C).

D-11 Please refer to the conceptual Reclamation Plan, Appendix C, for a description of topsoil stockpiles.

D-12 The text has been reworded to indicate that if significant pollution hazards occur during construction or operation, they will be controlled. The lead agency is directed, under NEPA, to determine significance in relation to impacts and the use of this qualifier is consistent with that direction.

D-13 The three topics were covered individually in the DEIS (pages 4-25, 4-36, 4-38, and 4-39). The language of the mitigation measures discussed in these responses was formulated to cover the unforseen accidents which occur during an operation of this size.

D-14 In order to arrive at an estimate of project effects relative to historic conditions, the Universal Soil Loss Equation and the Modified Universal Soil Loss Equation were used together with a sediment delivery ratio to predict the sedimentation in area streams. This approach is described in more detail in the Surface Hydrology Technical Report, copies of which are on file with the Forest Service. The mitigation measures described in the EIS (Chapter 4) and the Reclamation Plan (Appendix C) outline the measures designed to minimize project-generated sediment. It should be pointed out that the 500 and 100 mg/l figures do not take into account possible mitigation measures. The Forest Service believes there are sufficient controls on project-related activities on public land and that the Compliance Schedule Order between Noranda and the Idaho Department of Health and Welfare addresses these effects on private land.

D-15 This assumption was made in order to address the effects of increasing the amount of treated water being discharged into Blackbird Creek. Calculations were based on the assumption that the concentration of metals in the effluent would remain constant. Given the uncertainty of the future discharge permit, the decision was made to use the existing limitations, which would represent a "worst case" situation since future limitations are likely to be more stringent, rather than less so.

16 5-15 We would not consider a breakdown in the sewage treatment plants a water quality benefit. Although increased organic loading may allow complexation of metals, other detrimental impacts would outweigh that benefit.

17 5-15 The 8-16 acre feet of water that seeps through the tailings dam will be high in metal concentrations. During operation, it will be pumped back into the impoundment; but, if "the seepage should cease within two years after abandonment" what will be the impacts and potential mitigations during those two years?

18 5-16 We find more than "limited" periphyton and benthic macroinvertebrate communities in Panther Creek below Big Deer, as well as above Big Deer. In August 1981, populations were dense in all but "Panther and Blackbird" stations.

19 5-16 What "productivity" data were collected on benthic macroinvertebrates? We have seen diversity and standing crop data presented, but no productivity data.

7-1 With reference to paragraph #3, we strongly agree with the conclusion that Alternative 1 is best for water quality at abandonment. Ability to avoid those tunnels and diversions is an important consideration in selection of alternatives.

Please consider this an addendum to our comments made earlier.
Thank you for the opportunity to comment on this draft EIS.

Sincerely,

Lee W. Stokes, Ph.D.
Administrator

LWS:par

D-16 This statement in the DEIS considered only heavy metal pollution as a limiting factor for stream quality. The statement has been reworded in the FEIS.

D-17 Abandonment will be a gradual process, during which production will gradually decrease. Seepage will gradually decrease prior to and after abandonment, and is expected to be contained in the cut-off dam. On public lands, the Forest Service in cooperation with Idaho Department of Water Resources, Department of Health and Welfare, and the EPA will determine when the goals of reclamation have been met and the bond released. On private land the primary responsibility for this procedure lies with the state agencies and the EPA. These and similar topics were discussed at an interagency meeting on May 12, 1981 in Boise, Idaho.

D-18 The data used in the EIS is a summary of numerous sampling programs done prior to the 1981 field season. The Forest Service is interested in obtaining the results of the 1981 program and cooperating with the IDHW-DOE on future sampling programs.

D-19 More complete data on these organisms are found in the Aquatic Biology Technical Report, available from the Forest Service. No data were collected on which to base productivity predictions; assessments were based on standing crop and species diversity data.

LETTER E

E810
1950

STATE OF IDAHO

DEPARTMENT OF HEALTH
AND WELFARE

DIVISION OF ENVIRONMENT
Statehouse
Boise, Idaho 83720

September 21, 1981

Mr. Richard T. Hauff, Forest Supervisor
Salmon National Forest
P.O. Box 729
Salmon, Idaho 83467

Dear Mr. Hauff:

1 The Division of Environment, Idaho Department of Health and Welfare, has reviewed the draft EIS for the Blackbird Cobalt-Copper Project and wishes to submit the following comments:

The EIS adequately addresses water quality impacts associated with the selected alternative. Water quality is expected to improve with this alternative and will be monitored through a compliance schedule with the Division of Environment.

Thank you for the opportunity to comment on this Environmental Impact Statement.

Sincerely,

Al E. Murray

for Lee W. Stokes, Ph.D.
Administrator

LWS:par

SALMON N.F.
COPY
P.C.

SEP 24 '81

Sent to A-1 9/24 Kg

EQUAL OPPORTUNITY EMPLOYER

RESPONSE TO LETTER E

E-1 The Forest Service appreciates receiving your comments.

LETTER F

2810

The SHOSHONE-BANNOCK TRIBES

FORT HALL INDIAN RESERVATION
PHONE 238-3826
238-3824
238-3827
238-3823

LAND USE COMMISSION
P. O. BOX 306
FORT HALL, IDAHO 83203

October 21, 1981

10/23

Supervisor's Office
Salmon National Forest
Salmon, Idaho 83467

Dear Sirs:

We would like to comment on the Draft Environmental Impact statement for the proposed reopening of the Blackbird Cobalt-Copper Mine.

1 The Shoshone-Bannock Tribes have certain Treaty Rights protecting off-reservation hunting and fishing rights. In accordance with these rights, we recommend the NO ACTION ALTERNATIVE so that fish and wildlife would be maximally protected.

Sincerely,
LAND USE COMMISSION

Matilda Warjack, Chairperson

Edward Boyer, Commissioner

Abner Hevewah, Commissioner

RESPONSE TO LETTER F

F-1 The Forest Service will consider your recommendation when going through the decision making process.

LETTER G

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
SEATTLE REGIONAL OFFICE
ARCADE PLAZA BUILDING, 1321 SECOND AVENUE
SEATTLE, WASHINGTON 98101

October 26, 1981

REGION X

IN REPLY REFER TO:
10C

Received Cobalt R.D.
OCT 30 '81

Mr. Tom Buchta
Project Coordinator
Cobalt Ranger District
Cobalt, Idaho 83229

Dear Mr. Buchta:

Subject: Draft Environmental Impact Statement
Blackbird Cobalt - Copper Project
Lemhi County, Idaho

Our Portland Area Office has jurisdiction over HUD programs in the State of Idaho. They have reviewed your Statement and their comments are attached.

Thank you for the opportunity to comment.

Sincerely,

Gordon N. Johnston
Regional Administrator

Attachments

cc: Cliff Safranski
Nile Paull

Memorandum

U.S. DEPARTMENT OF
HOUSING AND URBAN DEVELOPMENT

TO : Robert C. Scalia, Regional Director for CPD DATE: 10/21/81
Seattle Regional Office
Through: Nile Raull, Area Manager, PAO

FROM : Clifford L. Safranski, Environmental Staff, PAO

SUBJECT: Review of the Blackbird Cobalt - Copper Project EIS
Lemhi County, Idaho

We have reviewed the above subject EIS using 24 CFR Part 50, Subpart F as guidance and make the following 18 comments supported by the enclosed detail comments.

1. Tailings from previous mining activity will continue to prevent restoration of Blackbird Creek to a condition where it can support aquatic life.

2. The metals from the mining operation are critical to national oevelopment.

3. Construction to withstand seismic disturbances and heavy snow loads is necessary.

4. Are cumulative effects of growth in mining, lumber and tourism considered?

5. Will the increased economic base support the needed infrastructure and allow the locality to be debt free at the time of mine abandonment?

6. Will hazardous materials be routed away from the populated areas and hazardous waste disposed of at special disposal sites?

7. Has an open channel diversion route near the old tailings been considered as infeasible?

8. Is fire safety from the "hot emissions control device" adequate?

9. Are the comprehensive plans of Lemhi County and the City of Salmon compatible?

10. To what extent will Noranda participate in housing for their employees?

11. There may be inconsistencies in the ratio of Cobalt to Copper produced as reported.

12. It would be helpful to show the adverse effects without mitigation to emphasize the degree of mitigation provided.

13. A conflict between raw sewage and heavy metals mentioned on Page 5-15 could be further explained.

14. Can management schedule shift changes to protect wildlife browsing between dusk and dawn?

15. Will noise sensitive uses such as residences, hospitals and schools be protected from heavy traffic?

16. Will reclamation planning include the transition of the urban and developed areas after mine abandonment?

17. Will infrastructure be designed to phase down maintenance costs after mine abandonment?

18. Can historic preservation of the three cabins be considered feasible?

Thank You for the opportunity to comment. We look forward to the upcoming Challis National Forest Land and Resources Plan which may consider all the potential development sites in the area and their overall impact.

Comments are more detailed in attachment.

Environmental Clearance Officer

Attachment

Attachment

Blackbird Cobalt - Copper Project , Lemhi County, Idaho

1 1. It appears that restoration of water quality adequate to support acquatic life in Blackbird Creek is highly dependent upon avoiding tailings from previous activity as well as from any new activity.

Page 2-7 states Blackbird Creek drainage has a high potential for floods and that hydralogic connections exist between groundwater flow systems and the surface water in the area. The bedrock groundwater system is intercepted by mine workings and discharges into Blackbird and Bucktail Creeks. Page 2-10 states, "The mine is drained at the 6,850' level where the water which has flowed over and percolated through the sulfide-rich rocks is oischarged into surface water".

Page 2-11 states that copper is the primary concern to aquatic life because of its toxicity but page 2-14 states that water from higher levels will be diverted to the 6,850' portal for treatment which will reduce copper loadings 25-50%.

Page 2-14 states that dams are responsible for most Chinook Salmon and Steelhead declines yet page 2-15 states the Chinook Salmon run began to decline about 1940 and dropped sharply following the development of a mine on Blackbird Creek in 1949. Page 2-18 further states, "The Blackbird Creek riparian zone has been largely eliminated by toxic tailings from previous mining".

2 2. Cobalt and copper are critical elements for national development.

Page 2-20 states, "Cobalt is classified as a strategic metal... used for... desulfurization of crude oil and liquification of coal".

3 3. Climatic and geologic conditions suggest special building conditions.

Page 2-20 refers to seismic activity that resulted in intensity V shaking in the area. The current Uniform Building Code or HUD/FHA data sheet 79g standards should be utilized.

In addition, the pages 21 and 22 snow conditions suggest that snow removal and snow loads on structures are significant design factors.

4 4. Lemhi County had a population growth of over 26% between 1970 and 1975 according to page 2-25. The next five years added only about 6% more. Are the growth inducing factors, other than the mine, static or can another spurt be anticipated during the life of the mine?

RESPONSE TO LETTER G

G-1 During the operation of the mine, the limiting factors for restoring water quality in Blackbird Creek are primarily the non-point sources in the drainage left from previous mining operations. These include waste rock and tailings (page 2-10, last sentence in the first paragraph). At abandonment, sealing of the underground mine will result in about a 40 percent reduction in metal ions from mine drainage compared to baseline conditions. Although it is expected that pollution from non-point sources will also be reduced, the degree of improvement is uncertain since the three year study identified in the Compliance Schedule Order will not commence until July 1, 1982.

G-2 The Forest Service concurs.

G-3 The Forest Service concurs.

G-4 The Forest Service believes the decrease in population growth between 1975 and 1980 is adequately explained by the reduction in the forest products industry during the same period. Existing trends are expected to continue and any additional spurts would likely be due to unanticipated changes in the mining sector.

5 — 5. Given bonding and levy limitations as expressed in pages 26 and 27, will the required infrastructure be paid for during the life of the mine and will local government be able to support maintenance of it after mine closure?

5 A — 92% of the land in Lemhi County is owned by Federal, State and local governments with less than 1% in urban uses. What proportion of the new economic base from the mining operation will be received by the City of Salmon?

5 B — Page 2-29 states total reported crimes decreased 4% in Lemhi County while increasing 193% in neighboring Custer County 1973-1978. Is this largely a reporting factor, an enforcement factor, an exporting factor, or due to some other phenomena? Can this be expected to be repeated over the next 20 years?

5 C — Fire protection in Salmon is the best in the region at this time. Will the increased population and traffic encourage EMT 2 or EMT 3 personnel development? Would it be prudent to have one full time paid chief and expand the area covered? The rural areas of Lemhi County have very limited fire protection service.

5 D — Page 2-31 states that the Salmon water system is currently operated at capacity as is their wastewater system and the solid waste disposal services are trying to reach compliance.

In addition, elementary schools need additional teachers.

This suggests competition for bond marketing all based on the same economic base.

5 E — Page 2-28 states, "The overall housing situation in Lemhi County can be characterized as having few rentals, expanding mobile home opportunities and numerous singlefamily homes that are vacant or for sale". Housing units in Lemhi County increased by 53% while housing units in Salmon increased only 32% 1970-1980. This suggests the need for new construction and mobile homes as well as loan funds for purchasers.

6 — 6. Will transportation of hazardous materials be routed away from residential areas and places where people assemble and be scheduled to limit possible conflicts with heavy traffic flow periods?

Page 4-8 states, Reagents include lime, polymer, alcohol frother, copper sulfate, calcium oxide or sodium carbonate, sulfuric acid, sodium cyanide and xanthate. In addition, diesel fuel, gasoline and explosives will be stored and transported.

Page 4-27 states, The Deep Creek-Williams Creek route is preferred but it is presently considered a single lane road which requires

G-5 Please see the new socioeconomic summary (Table 5-4) in Chapter 5 of the FEIS. The analysis indicates that additional infrastructure requirements due to the Blackbird Project are rather limited. The major project-related impact of concern is the housing needs of the additional population. It is not possible to predict whether either this infrastructure or housing will be paid for at mine closure, although it does not appear likely given the projected project life and typical bond and loan amortization.

5 A Please see the new summary (Table 5-4) in Chapter 5. The City of Salmon will receive a significantly smaller portion of the new economic base since the mine site is located outside of the city's jurisdiction.

5 B A portion of this increase was attributed to an increase in the number of law enforcement officers (V.T.N. 1980, Thompson Creek EIS). Although the increased population due to the Blackbird Project could increase the total reported crimes, as large an increase as occurred in Challis is not anticipated.

5 C Noranda has trained, at its own expense, eight EMT personnel. Such a program will continue and will benefit the community in which these persons live. Although company and city-county policy will likely encourage most new growth to occur in and adjacent to Salmon, we believe that by 1986 the option for full-time services should be considered.

5 D The issue of infrastructure and bonding has been addressed in the FEIS. Project-related impacts on sewer and water are predicted to be negligible, while the increases in school services could be handled within the increases in the county tax base.

5 E The Forest Service concurs. See Section 5.2.12 (Housing) of the FEIS.

G-6 The heavy traffic associated with the mine will occur on Forest System roads or public highways. Residential contact will be minimal, although Highway 93 does pass between the junior high school and high school. With the use of vans or buses, congestion is not expected to become a significant problem. As for hazardous waste see response S-3.

improvements particularly to the rocky and rough Deep Creek portion. Will the access to and egress from this route avoid residential uses? Where will the chemical waste dumps be located?

Can solid waste mentioned on page 4-39, and hazardous waste be effectively separated for disposal at different, acceptable disposal sites?

7

7. Map modifications may be helpful and may more clearly reflect why a more direct route using a concrete-walled open-channel through the existing tailings or on its periphery wasn't considered as an alternative. This would provide a diversion channel at a lower elevation and would seem more economic than tunnels.

Page 4-32, Figure 9 is not legible for legend elements 5 or 6 and page 4-34, Figure 10 is not legible for element 6. If these elements are not portrayed it would be helpful to revise the legends.

8

8. Is it feasible to devise a by-pass or cut-off to the "hot emmissions control device" for use in the "attainment" area where fire and explosion may be more hazardous than the air quality?

9

9. Does the "Salmon Growth Management Plan" prepared in 1980 include "extra-territorial" control for zoning adjacent to the corporate boundaries?

Page 2-27 states a comprehensive plan is being developed for Lemhi County and page 5-29 states a draft comprehensive plan for Lemhi County was recently completed by ECIPDA. What is the status of the plan now and does it accomodate Salmon?

Will the City of Salmon share proportionate to its increased responsibilities, in the significant increase in taxes paid to Lemhi County?

10. Will Noranda buy undeveloped land in and around Salmon, prepay taxes to permit infrastructure to serve that land and then either lease lots to employees or make lease-purchase arrangements for employee housing?

Page 3-37 states, New employees will be encouraged to locate near the City of Salmon; a housing assistance program will be developed to aid employees in locating and financing housing, and Noranda has expressed a willingness to prepay local government taxes as a means of relieving fiscal impacts.

G-7 The decision to use tunnels rather than open diversions at the lower site was based upon a preliminary geotechnical study of the site. This study found that because of the extensive talus deposits and a possible weakness in the existing structure itself, tunnels were the technically desirable option.

Figures 4-9 and 4-10 have been changed in the FEIS.

G-8 With caution, such a measure should not be necessary.

G-9 The Salmon Growth Management Plan addresses an impact zone surrounding the city. Adoption of formal boundaries has not yet taken place. The ECIPDA Plan is out in draft form and does address Salmon in a very general way. The City of Salmon is not expected to receive an increase in the tax revenues proportionate to the increase in demand for services from the mine-related population increase. Please refer also to the new summary table (5-4) in Chapter 5.

10 Page 5-42 and 5-43 express that housing is a national problem. However, some private companies have been able to underwrite some of the costs and/or provide favorable loans.

Some tools used include arrangements with lending institutions which hold significant company deposits to provide favorable loan rates to company employees; underwriting of the risk by the company so that lower interest rates can be charged; acquisition of housing sites by the company or 20 year land leases; pre-paying for water and sewer so the lots can be improved at the time they're needed without costly delays; purchase of municipal bonds and school bonds to allow timely improvements; direct loans to employees; provision of technical financing advice to employees; and similar activities.

It could be anticipated that the average employee earning $29,000 could afford a $58,000 to $72,000 residence if the mine could be anticiapted to operate 30-40 years - or if alternative jobs would become available when the mine is abandoned. The 15-20 year life expectancy of the mine jobs suggest lower cost housing or some form of assistance may be needed.

11 11. As a layman in those matters, I could not understand what appeared to be inconsistencies in the ratio of cobalt to copper.

Page 5-3 suggests twice as much cobalt as copper, page 5-4 suggests less than one-fourth as much cobalt as copper and page 5-24 suggests about half as much cobalt as copper.

12 12. What would the effects of the mine be without mitigation?

Page 5-8 states sediment loading to Blackbird Creek is expected to increase 26%.

Page 5-13 and 5-14 reflect the current NPDES permit allows .6 lbs. per day monthly average for copper and alternative 1 is projected to result in 1.4 lbs. per day. Likewise, the daily maximum is raised from 1.2 lbs. per day to 2.8 lbs. per day.

13 13. Is it unacceptable to permit sewage or sludge to be added to the creek "if" it improves on the heavy metals problem?

Page 5-15 states, If a breakdown in the sewage treatment plant allows sewage or sludge into the creeks, it could be considered a "minor benefit".

G-10 Please see the summary table (5-4) in Chapter 5 of the FEIS for a more complete response to this question.

G-11 The figures in question have been revised in the FEIS for consistancy. The figures on page 5-24 refer to actual pounds of metal and reflect the fact that the ore contains less cobalt than copper.

G-12 The increase of approximately 26 percent in sediment delivered to the streams does not take into account possible mitigation measures. Please see response D-14.

To give an idea of the copper loading reductions due to the water treatment plant, approximately 12 pounds of copper per day were contributed to Blackbird Creek by the 7400' and 6850' portals. These flows are now treated with a daily maximum limit of 1.2 pounds (2.8 pounds at full production). The section in Chapter 5 concerning effects on water quality also discusses unmitigated conditions by comparing historic (pre-Noranda) conditions and percentages of improvement.

G-13 The dumping of sewage into Blackbird Creek is not acceptable. The text has been changed to clarify this situation. (Please see response D-16.)

14

14. Can adverse impacts on wildlife be mitigated by management devices?

Page 5-19 states that poaching may be the single most adverse effect to wildlife and road-killed wildlife is an additional concern. Will work shift changes be scheduled to avoid the browsing periods of dusk and dawn?

15

15. Are transportation routes away from noise sensitive uses such as residences, schools and hospitals?

The noise from heavy vehicles in the range of 80-90 dba at 50 ft. was addressed on page 5-27 for the mine site. Have off-site transportation routes considered the HUD noise standard of 65 ldn for noise sensitive uses?

16

16. At the time of mine abandonment, would the 1,153 people generated by the Blackbird project leave the area or will some be absorbed into changed economic base such as tourism?

Will reclamation plans for the natural areas be expanded to include transition plans for the impacted urban area which will experience withdrawl of economic base, possibly including a substantial remaining bonded indebtedness?

Page 5-35 expresses that about 50% of the housing units generated are expected to be mobile homes. These may be moved, sold or depreciated out at the time of mine abandonment. However, a substantial number of permanent-type residences will also be generated. What will be the impact on equity and remaining life of residences in the Salmon area after mine abandonment?

17

17. Will the needed improvements in infrastructure be designed for phasing down to reduce maintenance costs when the mine is abandoned?

Pages 5-37 and 5-38 address the need for increased fire protection, utilities and school services.

The schools in Salmon are projected to receive a 13% increase in enrollment. Without additional space and teachers this could reduce the educational experience of students within the district. However, physical improvements to accomodate the additional students could be designed to either be retractable after the mine closure or flexible enough to accomodate alternative use.

Page 5-44 recognizes a substantial increase in services required by the Salmon fire department. If the fire rating is higher than 8 it would be considered undesirable. The higher rating would also increase fire insurance costs therefore adding to housing costs.

G-14 There are no plans to alter shift changes. The use of mass transit for transporting employees to and from the mine will serve the same end. This type of impact will be monitored to determine if a problem does exist.

G-15 As noted in response G-6, transportation routes are on Forest lands, rural areas, or along major public highways, so additional impacts should be minimal.

G-16 These questions are addressed in the socioeconomic summary table (5-4) in Chapter 5 of the FEIS. In summary, the public sector should not have project-related bonded indebtedness at mine closure. Given current economic conditions in the private sector, it is unlikely that lending institutions will finance housing for a 15-year project life. Therefore, the risk for such loans, if any, will likely be underwritten either by the company or the federal government. Past experience with the Blackbird Mine closing in the late 1950's indicates that population and hence housing use could remain stable over the long-term.

G-17 Infrastructure design will be determined by city and county governments based on anticipated future needs. Closing the Blackbird Mine may not significantly affect the demand for services in Salmon over the long-term.

18 18. Are the 3 cabins mentioned on page 5-45 worthy of moving to aid in the transition to tourism as part of the new economic base after the mine is abandoned?

G-18 The cabins mentioned do not appear to be of sufficient interest to qualify as a tourist attraction.

LETTER H

11/12/81

NOV 12 '81

1 Point or questions you feel should be addressed. Along with the financial benefits that the Blackbird project would bring to our area it is important for the residents of Lemhi County and Salmon in particular to know the costs of such a project. The costs to the city for various improvements; i.e. schools, water, sewer, streets, etc. must be considered and weighed against the projected benefits.

2 Items you feel should be made clear. As a father of two young children I am very concerned about possible crowding conditions in the lower levels of our schools. The best way to avoid a possible over-enrollment is the early release of information to the public on when an impact will occur and how much of an impact is expected. If Noranda would take the initiative and work with Salmon on the planning necessary to teach the extra enrollment I believe they will be fullfilling their community responsibility.

3 Statements of agreement-disagreement. Not really a disagreement, but I think it makes good economic sense for Noranda to utilize the existing Cobalt townsite as much as possible for its employees. If Noranda would somehow encourage the use of this existing housing it would save Salmon a lot in service costs. This would be especially true in the early years of the operation when services would lag behind the tax base.

4 In the same light, I would encourage Noranda to pre-pay their local taxes for a specified period of time. The community good will and easing of the city's budget this would create would be well worth the effort in the long run.

Charles B. Drew

Charles B. Drew, DMD

RESPONSE TO LETTER H

H-1 A summary table (5-4) has been added in the FEIS to address these concerns.

H-2 The Forest Service believes, with the additional discussion mentioned in response H-1 above, and the commitment by Noranda presented on page 4-36, that this concern can be satisfied.

H-3 The current proposal does involve using Cobalt as the site for the construction camp to avoid a large and sudden influx of workers into Salmon. During the operation of the mine the townsite will be used to the extent that facilites will allow. This is not expected to comprise a significant percentage of the total workforce however, due to limited facilities available. (Please see page 4-3.)

H-4 Noranda has expressed their willingness to prepay taxes.

LETTER I

Idaho Conservation League
Box 1922 Salmon, Idaho 83467 (208) 756-3982

NOV 15 '81

November 12, 1981

Jim Lancaster
Cobalt District Ranger
Salmon National Forest
Salmon, ID 83467

Dear Mr. Lancaster,

After carefully reviewing the Blackbird Draft Environmental Impact Statement, the Idaho Conservation League considers the DEIS an inadequate document which does not fulfill the requirements of the National Environmental Policy Act. Five areas of inadequacies exist in the document. No approval of the project should be given until these inadequacies are corrected.

The proposed alternatives do not represent a full range of options. The forest service should view the Blackbird project as an excellent opportunity to return the water quality of the drainage to natural conditions.

1 One alternative should seriously evaluate: steps necessary to return Blackbird and Panther Creeks to a natural state, areas of responsibility for the forest service and other agencies and areas of responsibility for Noranda. Since a study on nonpoint pollution has already been conducted, information is available. Allowing continued erosion of old tailings areas when equipment is on site is absurd. This alternative should consider ways the Blackbird project could rectify damage mining has had on the water and fisheries resource.

2 A second major inadequacy of the document relates to the analysis of socio-economic impacts to the Salmon area. At no point in the document are the costs of the impacts assessed. This is a major flaw. Dollar benefits of the project through taxation were thoroughly assessed, while no attempt was made to calculate costs to taxpayers for road maintenance, additions to schools and expansion of of social programs or facilities. Information on impacts to communities by other projects has been included in environmental impact statements (ie, Programmatic EIS on Phosphate Development in Southeast Idaho.)

Also, there seems to be a discrepancy in four reports which

RESPONSE TO LETTER I

I-1 This kind of approach was evaluated in the initial phases of Noranda's involvement with the Blackbird Mine by the agencies with primary responsibilities in this matter, chiefly Idaho Department of Health and Welfare and the EPA. As recently as May 12, 1981 at an interagency meeting in Boise, questions regarding reclamation goals and standards on public and private land were discussed. As stated in the November 10 meeting with the Idaho Conservation League, a complete return to pristine water quality may not be technically or economically feasible and was not felt to be a reasonable or enforceable alternative. The Forest Service neglected to display in the DEIS the reasons why such an alternative was not considered further; this discussion has been added to the FEIS.

I-2 The Forest Service has estimated the costs for needed improvements to community services even though the distribution of project-related population and households within the city as opposed to adjacent county areas cannot be accurately predicted, and types of capital facilities the community may develop and the associated costs cannot be predicted or controlled (see Table 5-4). In order to estimate effects, the Forest Service has calculated an estimated change in the tax base and sales tax based on the Blackbird Project. The FEIS indicates specific tax revenue sources generated by the Blackbird Project which will be available to at least partially offset project-related costs. Typically, specific public service cost estimates as presented in a regional or programmatic EIS are derived by applying standard cost factors to the total number of households or other units, e.g., increased school enrollments, to develop an aggregate estimate rather than figures distributed among specific jurisdictions, particularly at the community level.

3 project project-caused population growth. The DEIS should contain the criteria used to select the 1,153 number over the others. (ie., 1,925 International Environmental Consultant study; 1,153 East-Central Idaho Planning and Development Assoc.; 1,041 Stonehaven Corp. and 1,725 International Engineering Co.)

4 A third inadequacy is the basic premis of the DEIS. It is not the responsibility of the DEIS to assume the "worst possible situation." It is the responsibility of the DEIS to provide full and fair discussion of significant impacts and provide a range of reasonable alternatives which would avoid or minimize adverse impacts or enhance the quality of the human environment.

5 Because the Blackbird project will not only impact the natural environment but the socio-economic environment as well, a second set of alternatives should be developed which consider: Noranda's accepting financial responsibility for ALL project-related impacts to Noranda's accepting NO financial responsibility; as is now the case in the DEIS.

6 A fourth inadequacy concerns the consequences of the project never reaching full production. At this time the world market price for cobalt is $11 per pound; one half the amount necessary for profitability of the project, no government price support has been obtained and Noranda Mines Limited has not given approval for the project to move into full-scale production. The viability of the project is questionable. The DEIS should examine the impact to the human and natural environment if the project aborts for economic reasons. What are Noranda's responsibilities to the community if the project folds before costs for expanded services are paid? What are Noranda's reclamation responsibilities?

The DEIS should specifically list obligations Noranda has currently agreed to accept in terms of socio-economic impacts and environmental quality at full production and at projects termination for economic reasons. Because of the recent Cyprus project layoffs and the economic hardships ensued, the EIS should also include the terms of employment. The public as well as the contractors should be made aware of probable layoff schedules.

7 A fifth inadequacy relates to questions of reclamation. The DEIS does not mention who will be the responsible party for long-term maintenance nor what the quality of the reclamation will be. There is also a question as to which document is more binding; the EIS or the reclamation plan.

I-3 The major criteria separating the ECIPDA figures from the Stonehaven, IEC and IECo. figures were differences in basic employment figures used and the secondary employment multipliers applied to project total employment and population figures. The ECIPDA study was selected primarily because the methodology used to project secondary employment was based on a Idaho State University input-output model developed especially for the mining sector in Custer County. Use of input-output data when available for the specific area and industrial sector is widely-accepted as the most theoretically accurate projection methodology as opposed to use of standard factors based on a composite of estimated multipliers for similar projects elsewhere in the county.

I-4 There is some confusion over what is meant by a "worst case" assumption and how it was used in the DEIS. In the face of uncertainty in predicting effects where additional data is either technically or economically infeasible to gather, NEPA directs the lead agency to use the worst case set of assumptions in the analysis and prediction of impacts. Socioeconomic mitigation alternatives are presented in Table 5-4.

I-5 The range of alternatives considered in an EIS should respond to the major issues, concerns, and opportunities, provided they are reasonable in a technical and economic sense. Noranda has accepted financial responsibility for the socioeconomic impacts of the proposed project by their involvement in and funding of socioeconomic studies beginning in 1979, including the Salmon Growth Management Plan as well as their proposal to prepay taxes and help employees locate and finance housing in Salmon. A discussion of planned socioeconomic mitigation measures and other mitigation options is presented in Table 5-4 of the FEIS.

I-6 The question of impacts due to the project being abandoned prior to construction and operation is outside the scope of the EIS. The summary table in the FEIS (Table 5-4) addresses the socioeconomic impacts of mine closure upon abandonment.

There are no schedules for employment or layoffs other than the schedule presented in the EIS (Figure 4-1). Noranda has said it would provide information on changes in future employment levels as it becomes available (page 4-36).

I-7 The Reclamation Plan has been rewritten to clarify goals and maintenance objectives. It should be noted that the EIS also describes reclamation responsibilities and quality, in addition to the Reclamation Plan (p. 4-36 bullets 2 through 5, Sections 4.5.4, 4.5.5, p. 4-40, p. 4-18, and p. 4-25).

As noted on page 4-40 of the DEIS, the Operating Plan will be the legal contract between the Forest Service and Noranda.

8 In the DEIS an emergency spillway is proposed to avoid erosion of the tailings dam, but no spillway is discussed in the reclamation plan. There are no provisions in either document which discuss reclamation if Noranda aborts the project. These questions should be addressed in the DEIS. Without such information it is difficult to assess the quality of the reclamation program.

Of the alternatives presented ICL supports Alternative 1 but does not believe it or the other alternatives go far enough in evaluating the major impacts by this project.

Alternative 1 represents the best opportunity presented in the DEIS to somewhat improve water quality conditions of Blackbird and Panther Creeks during the life of the mine and at abandonment. This alternative provides greater geotechnical and hydrologic stability for the tailings dam and water reservoir than do alternatives 2 and 3.

ICL is not opposed to the Blackbird project. We believe it can occur without substantial harm to the community or environment. However, to mitigate the impacts all courses of action should be reviewed. Only then can the best decision be made.

Unfortunately, the DEIS does not provide the necessary information for this review. We are disappointed with the content of the document and urge the forest service to correct the inadequacies before making a final decision of the project.

Sincerely,

Salmon Chapter ICL
Lill Erickson
ICL Organizer

I-8 The Reclamation Plan in the FEIS describes the spillway

Please see page 4-40 in the FEIS for a description of the bonding process used to guarantee reclamation in the case of mine closure.

LETTER J

✓1950
2810

Idaho Conservation League
Box 844 Boise, Idaho 83701 (208) 345-6933

SALMON N.F.
COPY
P.C.

NOV 16 '81

CCto D-1 11/16

November 12, 1981

Mr. Richard T. Hauff,
Forest Supervisor
Salmon National Forest
Forest Service Building
Salmon, Idaho 83467

Dear Mr. Hauff:

Thank you for the opportunity to comment on the Draft Environmental Impact Statement, Blackbird Cobalt-Copper Project. These comments are to supplement the official Idaho Conservation League comments being submitted the Salmon Chapter.

1 We have a number of concerns which we believe were not adequately addressed in the Blackbird DEIS. We were very disappointed in the discussion of socio-economic impacts of the project on Salmon and the surrounding community. We believe more emphasis should have been placed on the social and community aspects of the increased workforce created by expansion of the Noranda project, including a discussion of social impacts based on the experiences in Challis.

2 We are also disappointed in the range of alternatives presented in the DEIS. No alternative was offered which enhanced the environment, by requiring that the Noranda operation permenantly improve the quality of Blackbird Creek or take other measures which would mitigate the damage done by past mining operations at the site. Because the Forest Service is required to consider a full range of alternatives in a DEIS, we believe an environmental enhancement alternative should have been presented and considered.

The Idaho Conservation League is willing to support Alternative 1, the Forest Service Preferred Alternative, if the following changes are made:

3
1. Noranda agrees to pre-pay taxes to Lemhi County, the School District, and other local government entities which will be heavily impacted by expansion of the Blackbird operation;
2. Noranda agrees to seal the mine at the end of operations; and
3. Noranda agrees to build a fence around the tailings ponds now, so wildlife losses are minimized.

Thank you for this opportunity to comment. If you need clarification of the points ra sed above, please let us know.

Sincerely,

Bruce Boccard

Bruce Boccard
Research Coordinator

RESPONSE TO LETTER J

J-1 The full range of socioeconomic topics typically dealt with at the community level has been included in the discussion of Salmon and Challis in the EIS, including the impacts of the proposed project (see Table 5-4).

J-2 Please see response I-1.

J-3 These items are addressed in the DEIS on page 4-37, in the Reclamation Plan (Appendix C), and on page 4-38, respectively.

LETTER K

JOHN R MOELLER
1454 LAKEVIEW DR
POCATELLO ID 83201

Western Union Mailgram

4-0489495316 11/12/81 ICS IPMMTZZ CSP POCB
2082366160 MGM TDMT POCATELLO ID 48 11-12 0458P EST

DICK HAUFF
SALMON NATIONAL FOREST
SALMON ID 83467

1 POCATELLO ICL BELIEVES DEIS IS INADEQUATE. DOESN'T FULLY ADDRESS SOCIO ECONOMIC IMPACT NOR CONSIDERS FULL RANGE OF ALTERNATIVE WITH REGARD TO WATER QUALITY. NO APPROVAL OF EIF SHOULD BE GIVEN UNTIL THESE PROBLEMS ARE ADDRESSED
POCATELLO CHAPTER IDAHO CONSERVATION LEAGUE

1700 EST

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R-WL	1	2	3	4	5	6
A.O.	1	2	3	4	5	6
CIWA	1	2	3	4	5	6

2c to D-1 11/16 Kg

RESPONSE TO LETTER K

K-1 The FEIS has expanded its consideration of socioeconomic effects and water quality alternatives.

LETTER L

JANICE M BROWN
486 NORTH RIDGE AVE
IDAHO FALLS ID 83402

Western Union Mailgram — United States Postal Service — U.S. Mail

4-0109855317 11/13/81 ICS IPMMTZZ CSP POCB
2085269491 MGM TDMT IDAHO FALLS ID 49 11-13 1037A EST

FOREST SUPERVISOR SALMON NATIONAL FOREST
PO BOX 729
SALMON ID 83467

1 I FIND THE BLACK BIRD MINE DRAFT EIS INADEQUATE. A FULL RANGE OF ALTERNATIVES ISN'T PROVIDED, AND SOCIO-ECONOMIC IMPACTS AREN'T SUFFICIENTLY ASSESSED. THERE'S NO MENTION OF HOW TO RETURN THE WATER TO ITS NATURAL STATE.

JANICE M BROWN

1041 EST

MGMCOMP MGM

SALMON N.F.
COPY
P.C.

NOV 16 '81

INFO. ACTION

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A.O.	1	2	3	4	5	6
CIWA	1	2	3	4	5	6

CC to AO-1 11/16 Kz

RESPONSE TO LETTER L

L-1 The FEIS has expanded its consideration of socioeconomic effects and water quality alternatives.

LETTER M

11/12/81

Mr. Buhta,

1 Point or questions you feel should be addressed. As a homeowner and taxpayer in Lemhi County I believe that prepayment of taxes should be made. Salmon is not a rich community and will need all the help it can get. I am also concerned

2 about quality growth in Salmon - no trailer court sprawl - we do not yet have zoning laws to prevent this sort of thing. We may need help to adequately prevent problems with ~~the~~ increased use of our water & sewer systems. Schools probably cannot handle much of an increase in enrollment.

Items you feel should be made clear.

3 I believe that the mine should be sealed off at the end of the production cutoff. I feel this is mandatory and was very surprised to hear that there are no promise that this will be done except after a certain time period of production.

4 ~~Statements of agreement-disagreement.~~ I am also very concerned ~~that~~ that good reclamation procedures are carried out - Revegetation and continued water treatment and care of the streams - as well as this can be ~~taken~~ care of.

NOV 15 '81

ROUTE	TO	A
	DFR	
	FOR (R&L)	
	RNG CON	
	TMA	
	TEC (TM)	
	TEC (TM)	
	FMO	
	AFMO	
	Minerals	
	Clerk	

Karen Mangold
Box 1797
Salmon

RESPONSE TO LETTER M

M-1 Noranda has expressed a willingness to prepay taxes. See also page 4-37 of the document.

M-2 Zoning in Salmon depends upon the findings and adoption of the Salmon Growth Management Plan. Noranda has supported and partially funded this effort and the findings presented in this EIS should assist that effort.

M-3 Noranda has commited to sealing the mine following its productive life. Although there is no commitment for mine sealing prior to when operations cease, the mine drainage is currently regulated by the EPA as a point source under the NPDES permit.

M-4 Noranda has revised their Reclamation Plan for inclusion in the FEIS.

LETTER N

2810

DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

Centers for Disease Control
Atlanta, Georgia 30333
(404) 262-6649

November 9, 1981

Mr. Richard T. Hauff
Forest Supervisor
Salmon National Forest
Salmon, Idaho 83467

Dear Mr. Hauff:

We have reviewed the Draft Environmental Impact Statement (EIS) for the approval of an operating plan for the Blackbird Cobalt-Copper Project, Salmon National Forest, Lemhi County, Idaho. We are responding on behalf of the Public Health Service and are offering the following comments for your consideration in preparing the Final EIS.

We understand that Noranda Mining Inc. proposes to reopen the Blackbird Mine, rehabilitate the existing concentrator, and mine and process cobalt and copper ores.

1 In general, we have no major objections to the preferred alternative. However, we have some concern about the secondary effects of the proposed project upon the water supply and wastewater treatment system in the City of Salmon. It appears that the existing water supply system for Salmon will require additional capacity or improved efficiency of the existing system. Are these improvements feasible?

2 According to the EIS, the Salmon wastewater treatment system is not meeting the NPDES permit requirements and requires additional capacity. The potential public health consequences of not including the additional demands for sewage treatment from the "projected 1,038 new project-related residents" (Blackbird Mine) in Salmon should be further discussed. While the EIS indicates that the planned treatment plant expansion will be designed to handle a capacity of 2.0 mgd and could be easily modified during the planning stages to accommodate the sewage volumes associated with the proposed mine and its secondary effects, no commitment to increase the capacity of the proposed sewage treatment plant has been provided.

We appreciate the opportunity to review this EIS. Please send us one copy of the final document when it becomes available. Should you have any questions regarding our comments, please call Robert Kay of my staff at FTS 236-6649.

Sincerely yours,

Frank S. Lisella, Ph.D.
Chief, Environmental Affairs Group
Environmental Health Services Division
Center for Environmental Health

RESPONSE TO LETTER N

N-1 The figures used in the DEIS to describe the existing capacity of the water system were in error. Conversations with Salmon's City Clerk indicate that inflow and storage capacity is able to handle the expected population increases. There is a need to improve the delivery system. In this regard, plans are underway to add an additional mainline to maintain pressure in the summer months. Revised data are presented in the summary table (5-4) in Chapter 5.

N-2 At a public meeting in Salmon on 12-10-81, Ellsworth Engineering, who has been retained by the City of Salmon to conduct the facility design study for the sewer system, stated that in their opinion, the Blackbird Project would have a negligible impact on system design.

LETTER O

Noranda Mining Inc.
Blackbird Mine
P.O. Box 39
Cobalt, Idaho 83229
noranda

1950
2810

November 10, 1981

Salmon National Forest
P. O. Box 729
Salmon, Idaho 83467

Gentlemen:

We have reviewed the Draft Environmental Impact Statement for the Blackbird Cobalt-Copper Project and wish to make the following comments:

1 1. On P.4-1, paragraph 4.1, the sixth "bullet" would read better by substituting the following:"... and allows mining and associated activities in the production of cobalt and copper that are compatible with other multiple use activities of the area." after the phrase, "...which could be implemented by Noranda...".

2 2. The statements on p.5-19, Section 5.2.5 "Wildlife" relating poaching to mining activities seems unappropriate. Increased poaching could result from a number of factors. A couple of these may be a general increase in the number of people using the area for recreation or "routine" subsistence hunting. To focus on the mining industry is not an objective evaluation.

3 3. There is still a question regarding snow removal as discussed on p.4-37, Section 4.5.1 "Water Resources". Snow removal will be absolutely necessary for our operations, yet in most cases, it will be pushed aside to the edge of roads or the edge of a parking area. Snow will not be hauled to the sedimentation pond. Further snow melt and surface drainage will be diverted and directed to the yard drainage systems and collected in the sedimentation pond. Active waste rock piles will also require snow removal and here again, snow will be pushed to the side; but it will not be incorporated into the piles.

-continued-

RESPONSE TO LETTER O

O-1 The Forest Service agrees the statement could be clarified, however, the mitigation measures serve primarily to minimize adverse environmental effects. The statement has been modified in the FEIS.

O-2 The reference was not made to single out mining as being different from any project or activity which increases population in remote forested areas. Past experience has shown that any such activity will result in higher incidence of road kills or illegal hunting activity in remote areas. The reference to mining projects has been deleted.

O-3 The mitigation measure seems clear as worded. It does not require hauling snow to the sediment pond.

4 4. On p.5-15, there is a statement that, "any breakdown in the sewage treatment plant would result in the discharge of sewage or sludge into Blackbird Creek and Panther Creek." Not <u>every</u> breakdown will result in the discharge of sewage or sludge into Blackbird Creek. Also, partial treatment can be realized with most mechanical failures.

5 5. Table 4-3, <u>Monthly Material Requirements</u> on p.4-8 shows the Timber quarterly (tons) at approx. 2.2 (240,000 board ft.), whereas the estimated consumption of timber is 240,000 board feet, this would have an approximate weight of 300 tons (based on 30 lb. per cubic for Douglas Fir; "Mine Plant Design" by W. W. Stanley, p.44, McGraw-Hill, 1949).

6 6. Some of the graphics are unclear. It is difficult to find anything designating a new tailings area on Figures 4-10 and 4-11. Figure 4-9 also is unclear as to the location of the fresh water pond or the new tailings dam. The buildings labeled as "Warehouse" on Figure 4-4, p.4-14 should be "Lower Shop" and "Compressor House".

7 7. There are also tables that need to be corrected or clarified. Table 5-1 on p.5-2 shows I/O/I/L under the column for "No Actions" and the row for "Surface Water, Operations, Abandonment". The first letter "I" does not match with the Legend. On p.5-12, there is a discussion stating that Table 2-5 shows the relationship between pH and the toxic form of copper; yet inspection of Table 2-5 shows it to be a "Summary of Aquatic Biota in Blackbird Project Area". The footnote for Table 2-1, p.2-3, states "...reported by Calera 1958 Annual Report". This should be 1959.

8 8. There is a discussion on p.2-15, Section 2.5 <u>Aquatic Biology</u>, that relates, "...runoff and seepage from an open-pit mine and two portals which drain into Bucktail Creek, a tributary of Big Deer Creek..." to "Extensive fish kills...in Panther Creek during March, April and July of 1954." Development of the Blacktail Zone from the Bucktail side (the two portals) did not commence until 1956. The pit was started in 1957. Consequently metal leaching into Bucktail Creek/South Fork of Big Deer Creek/Big Deer Creek probably did not occur until 1958.

9 9. On p.2-11 and 5-14, there are discussions about the relative impact of Big Deer and Blackbird Creek on Panther Creek. In both places, it is suggested or concluded that Blackbird Creek has more of an impact

-continued-

O-4 The FEIS has the word "would" changed to "could".

O-5 The figure has been changed in the FEIS.

O-6 The graphics have been corrected in the FEIS.

O-7 These items have been corrected in the FEIS.

O-8 As noted, the pollution to Bucktail Creek did not play any role in the 1954 fish kill. The text has been revised.

O-9 Analyses of all benthic macroinvertebrate and water quality sampling data indicate that Blackbird Creek causes the most damage to Panther Creek although Big Deer Creek alone would still limit the aquatic resource in Panther Creek. The text on page 5-14 has been revised in the FEIS.

9. (continued)

on Panther Creek than Big Deer. This is questionable since there seems to be less aquatic life below Big Deer. See <u>Preoperational Biological Monitoring Survey for the Blackbird Mine Cobalt, Idaho July and August 1980</u>, by M. R. Speyer, Noranda Research Center, April, 1981. It is further stated on p.5-14 that "Big Deer Creek would continue to contribute metal loadings to Blackbird Creek" which is of course, an error.

10

10. The list of "Other Permits, Licenses, and Approvals" includes:

a. "Approval of the spill prevention control, and countermeasures plan by the U. S. Environmental Protection Agency...". The law requires that companies/facilities that have on-shore storage of oil, prepare a SPCC plan and keep it on file at the site. Generally, it is not reviewed or approved by the EPA. The plan must be implemented and periodically amended. Noranda has prepared and implemented a SPCC plan and will continue with this program for the 1200 ton per day operation.

b. "Approval of plans and specifications for the construction of new process water supply systems by IDHW-BWQ". The State is primarily concerned with potable water supplies and distribution; they generally do not get involved with process water systems. A permit to construct the process water system should be deleted.

11

11. The discussion on Waste Rock Disposal on p.4-11 states, "...the new waste rock disposal areas would be stabilized and reclaimed, as discussed in the Compliance Schedule Order, Appendix B, and Noranda's Conceptual Reclamation Plan included as Appendix C". Reclamation of waste dumps is not addressed by the Compliance Schedule Order and reference to this document in the above quoted sentence should be deleted.

12

12. On p.4-2, under Section 4.2.4, "Tailings Disposal Facility", there is the statement that "...only the upper Blackbird site has recoverable quantities of topsoil material. This material would be stockpiled on the south slope of Blackbird Creek Valley." Stockpiling of the topsoil should not be limited to just the south slope, and the last sentence

-continued-

O-10 The statements have been corrected in the FEIS.

O-11 The text has been changed in the FEIS.

O-12 The text has been amended to reflect this comment and the revised Reclamation Plan.

12. (continued)

in the above quote should be modified to state that the stockpiled material will be placed in the upper reaches of Blackbird Creek Valley.

13

13. There are several typographical erros in the document and a few are listed here:

a. p.v, first sentence, "woud".

b. p.xi, Table 4-7, "Tialings".

We appreciate this opportunity to comment.

Sincerely,

NORANDA MINING, INC.

Jim Johnstone
Site Manager

JJ:cl

cc:

0-13

These errors have been corrected in the FEIS.

LETTER P

2810

John V. Evans, *Governor*
Daniel T. Emborg, *Administrator*

State Capitol Building
Boise, Idaho 83720

DIVISION OF ECONOMIC AND COMMUNITY AFFAIRS

IDAHO STATE CLEARINGHOUSE

DATE: November 6, 1981

TO: Richard T. Hauff
Forest Supervisor
Salmon National Forest
P.O. Box 729
Salmon, Idaho 83467

M E M O R A N D U M

RE: Late comments received after sign-off for:

PROJECT TITLE	SAI NUMBER
DEIS BLACKBIRD COBALT COPPER PROJECT	00916215

COPY SALMON N.F.
P.C.

[illegible] 1[illegible] '81

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[illegible]	1	2	3	4	5	6
[illegible]	1	2	3	4	5	6
R-WL	1	2	3	4	5	6
A.O.	1	2	3	4	5	6
CIWA	1	2	3	4	5	6

cc to D-1 11/10 Kg

We are forwarding late comments received following the sign-off date of the above mentioned project(s). These are sent for your information. We would appreciate your response to any negative comments attached. If you have any questions, please do not hesitate to call the Clearinghouse Coordinator at (208) 334-4718.

IDAHO

STATE OF IDAHO

DEPARTMENT OF FISH AND GAME

REGION 6
1515 LINCOLN ROAD
IDAHO FALLS, IDAHO 83401

RECEIVED
NOV 6 1981
IDAHO DIV. OF ECONOMIC
AND COMMUNITY AFFAIRS

November 3, 1981

Ms. Gloria Mabbut
Idaho State Clearinghouse
Division of Economic and Community Affairs
700 West State Street
Boise, Idaho 83720

Dear Ms. Mabbut:

Re: Blackbird Cobalt-Copper
Project DEIS

Department of Fish and Game personnel have reviewed the Draft Impact Statement for the Blackbird Cobalt-Copper Project and offer the following comments:

Our Department has long been in support of any program that would improve water quality to the point where we could reintroduce anadromous fish to the Panther Creek drainage. We are very disenchanted with statements that refer to "beneficial effects" to the aquatic biota when the end result is still toxic conditions.

1 We support alternative one only because of the projected possibility of some water quality improvements after abandonment. Although it says that engineering steps will be taken to prevent sedimentation, there is no assurance that they will be accomplished and no mention of how maintenance would be carried out.

We feel, in general, that the sedimentation problems were not sufficiently addressed. For example, there will be increased sedimentation from disturbance of the landscape for new road construction and from increased maintenance of existing roads. We are concerned about the cumulative effects of these sediments both during operation and after abandonment.

2 Throughout the statement there is reference is "historical conditions" in regard to water quality. There is no definition of what era in history they are referring to. Historically, the water quality was pristine and the streams contained dense populations of fish and other aquatic flora and fauna.

3 Section 2.5 Aquatic Biology (Regional)

In our review of the technical report, we pointed out that much of the information on chinook salmon used was from the South Fork Salmon River summer chinook. The same information on summer chinook occurs in this statement. We would like to emphasize again that the number of summer chinook in the South

EQUAL OPPORTUNITY EMPLOYER

RESPONSE TO LETTER P

P-1 The EIS does recognize the impacts of sedimentation and identifies mitigation goals which will be met by the company. (Page 4-28 1st paragraph, bullets 2 through 5 on page 4-36, bullets 1, 4, 5, on page 4-37, bullets 3, 7, 8, 9, 10, on page 4-38).

P-2 See the definition of historical conditions in the glossary.

P-3 We regret that the changes were not made following your initial comments. We have corrected this section in the FEIS.

Fork Salmon River has nothing whatsoever to do with chinook in the Panther Creek drainage. There is a wealth of information on chinook salmon available in the literature and we recommend this section be rewritten. Emphasis should be on what pertains to Panther Creek.

Section 2.6 Wildlife

4 This section includes broad generalizations which infer wildlife habitats in Blackbird Creek are unimportant. We agree that vegetative diversity in the drainage is not optimum; however, areas such as Ludwig Gulch may be important for elk calving and the entire drainage has historically been hunted by local residents. The aspen stands and riparian areas are important to big game animals in the drainage.

Observations by the local Conservation Officer and hunters indicate the drainage has a reasonable good fall mule deer population.

5 Page 2-17 deals with the occurrence of game animals and raptors in the Blackbird Creek drainage. The word "only" is used five times in describing the presence of these wildlife species. We find this attempt to minimize the importance of wildlife in the area as unprofessional. A simple statement describing the presence or absence of these species would be more objective.

Section 5.2.5.

6 We agree that direct effects on wildlife will not be severe, given the scope of the proposed project. However, we suggest that the reason is due to the relatively small acreages involved rather than the poor quality of the habitat, as suggested. Also, the presence of a Fish and Game Conservation Officer will do little to minimize the direct habitat effects of the project.

Local Cobalt residents report that wolves have been sighted in the drainage. However, these reports have not been verified.

7 This section acknowledges the potential impact of legal and illegal hunting on big game populations in the region and suggests additional management efforts by our Department. Short-term reductions in game populations are also predicted. We feel the large social impact (more hunters) on wildlife is not adequately addressed in the DEIS.

8 The predicted short-term reductions in game populations is contrary to the increase called for in our 1981-85 Department management plans. We anticipate there will be an increase in legal and illegal hunting resulting from the influx of mining personnel which could have an affect on all big game species in all management units in the Salmon area. The Department will not have adequate funding to assess these impacts. The mitigations section does not address these problems.

Funding of helicopter surveys of big game management units in the Salmon area would be one logical mitigation measure to aid the Department in assessing big game population response to the added hunter pressure. Similar funding of aerial surveys was part of the mitigation package agreed upon by the Cyprus Mining Corporation in development of the Thompson Creek Project.

P-4 The discussion in section 2.6 was not meant to imply that the resource is unimportant; however, on-site reconnaissance in the drainage in 1980 by the Forest Service was the basis for the "generally poor" evaluation relative to the habitat present. The wildlife technical report contains much more detail on the wildlife resources, but it too notes that elk and deer use occurs mostly in the upper reaches of the drainage and not where direct impacts from the project are likely to occur.

P-5 The use of the word "only" is unfortunate and was not intended to minimize the importance of the resource. This statement has been reworded in the FEIS.

P-6 These changes have been made in the text of the FEIS.

P-7 The DEIS was a very concise summary of material presented in the Wildlife Technical report which devotes considerably more space to the social impacts on big game (pages 93 through 103 in the Technical Report). The Technical Report is on file with the Forest Service.

P-8 A mitigation measure which specifically addresses these impacts is the funding of an additional conservation officer, as previously mentioned.

Thank you for the opportunity to comment on this Draft.

Sincerely,

Tom Reinecker
Regional Supervisor
Region 6

LETTER R

United States Department of the Interior

OFFICE OF THE SECRETARY
PACIFIC NORTHWEST REGION
500 N.E. Multnomah Street, Suite 1692, Portland, Oregon 97232

SALMON N.F.
COPY
P.C.

November 9, 1981

ER 81/1865

Richard T. Hauff, Forest Supervisor
Salmon National Forest
P.O. Box 729
Salmon, Idaho 83467

Dear Mr. Hauff:

The Department of the Interior has reviewed the Draft Environmental Impact Statement for Blackbird Cobalt-Copper Project, Lemhi County, Salmon National Forest and has the following comments for your consideration.

General Comments

In view of the extremely perturbed condition of streams in the project area, any reduction of acidity and the related heavy metals contamination would improve water quality and aquatic habitat. The project, as proposed, should provide water quality benefits during the project and after abandonment. The implementation of these improvements to water quality should remain a prominent project feature for the life of the project and after abandonment.

Specific Comments

1 Table 2-5. The term "taxa" is not defined in the table or in the text of the DEIS on 2-15. The FEIS should distinguish taxonomic levels (i.e., family, genus, or species) and could name major taxa. Also, the terms "benthic Macroinvertebrate" and "Stream Macroinvertebrates" are undefined. Benthos exist in streams or lakes. If that column refers to invertebrate fauna of non-flowing waters, the FEIS should make that clear.

2 Paragraph 2.13.7 explains that there are ten developed campgrounds in the mine vicinity. This is the last we read of these campgrounds, and we are unable to determine whether they will be impacted or not. Paragraph 6.3, Evaluation of Alternative 1, (the alternative selected as preferred) states that, "None of the alternatives would have any significant effect on Forest Service programs in...recreation." We would expect mitigation

RESPONSE TO LETTER R

R-1 Table 2-5 has been modified in the FEIS, and definitions of terms are included in the Glossary. The Aquatic Biology Technical Report provides more detailed information and is on file with the Forest Service.

R-2 Effects on recreational facilities are discussed on page 5-38 of the FEIS.

measures to be undertaken if recreation facilities, including the referenced campgrounds are, in fact, affected by this project.

3 5-40. Effects of implementation of the project in relation to the increased need for road construction, upgrading, and maintenance will very likely increase sedimentation to tributaries of the Salmon River. Chronic sedimentation should be minimized to prevent downstream damage to spawning and rearing habitat of valued anadromous and resident fishes.

Thank you for the opportunity to comment on this DEIS.

Sincerely,

Charles S. Polityka

Charles S. Polityka
Regional Environmental Officer

R-3 Please refer to responses D-14 and P-1.

LETTER S

U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION X
1200 SIXTH AVENUE
SEATTLE, WASHINGTON 98101

1950
2810

REPLY TO ATTN OF: M/S 443

13 NOV 1981

Richard T. Hauff, Forest Supervisor
Salmon National Forest
U.S. Department of Agriculture
P. O. Box 729
Salmon, Idaho 83467

RE: Blackbird Cobalt-Copper Project Draft Environmental Impact Statement

Dear Mr. Hauff:

The Environmental Protection Agency (EPA) has completed its review of the draft environmental impact statement (DEIS) on the proposed Blackbird Cobalt-Copper Project in Lemhi County, Idaho. We found that the DEIS provides a generally thorough description of the project and of the environmental consequences of reactivating the Blackbird Mine. However, there are a few topics, where additional discussion in the Final EIS (FEIS) would help insure that we minimize the adverse environmental consequences of the project and maximize the potential environmental benefits associated with the project. Our thoughts on these areas and other suggestions are briefly outlined below.

Air Quality

1 The FEIS should contain a more thorough discussion of the air quality impacts of the project. Specifically, it should provide a table which lists the potential sources of atmospheric emissions of particulate matter (PM) and their estimated emissions. It should then estimate the effects that these emissions would have on ambient air quality in terms of consumption of the available air quality increment for PM under the Prevention of Significant Deterioration (PSD) program and compliance with the National Ambient Air Quality Standards for PM. The discussion should indicate how these estimates are derived.

Second, if auxiliary power sources are to be used prior to the availability of electricity from Salmon, Idaho then the air quality impacts of operating these power generating facilities should be examined in the FEIS. The FEIS should also indicate what control technology, if any, will be used to minimize the air pollutant emissions of these sources.

RESPONSE TO LETTER S

S-1 The information described is presented in the Air Quality Technical Report; a copy of this report will be forwarded to the EPA. This information was summarized in the EIS.

2 This project may need pre-construction permits under the Clean Air Act. Since the Idaho Legislature recently abolished the State Air Permitting Bureau, the normal course of action would be for EPA to issue a permit to construct under the New Source Review (NSR) program in the Idaho State Implementation Plan. However, EPA does not yet have the authority to issue pre-construction permits in Idaho. We are presently responding to the proposed rulemaking and hope to have the final rule and permitting authority promulgated by December 1, 1981. Therefore, Noranda should be advised of this situation and should contact our Idaho Operations Office in Boise to find out what procedures should be followed in applying for a pre-construction permit.

Finally, the FEIS should note that the River of No Return Wilderness is a Class II area under the PSD program, not Class I (as stated on page 2-22).

Water Quality

The DEIS's discussion of water quality needs clarification and expansion in order to resolve questions which remain about: (1) whether NPDES permits will be required, (2) the diversion of mine water to the treatment plant, (3) potential metals contamination of the groundwater resulting from sludge disposal, (3) the need for sediment containment facilities, and (4) the degree of potential water quality improvement during the time that the mine is operating and after the mine has closed. Our detailed questions and suggestions are presented in the enclosure to this letter.

Solid & Hazardous Waste Management

3 On November 19, 1980 EPA amended the hazardous waste regulations (40 C.F.R. Part 261) to temporarily exclude solid wastes generated by exploration, mining, milling, smelting, and refining of ores and minerals. This exclusion does not apply to solid wastes such as spent solvents, pesticide wastes, and discarded commercial chemical products that are not uniquely associated with mining and allied processing operations. If the Blackbird operation would generate any of these non-indigenous wastes and if they are identified or listed as hazardous in the Part 261 regulations, then they must be managed in conformance with these regulations. Consequently, the FEIS should describe any such non-indigenous wastes and discuss how they will be managed so that their disposal conforms to the requirements of the applicable regulations.

4 EPA would be glad to review the proposed spill prevention, control, and countermeasures plan (SPCC plan) upon request and provide comments where appropriate. However, the FEIS should note that EPA does not approve such plans prior to the commencement of facility operation, as noted in page 1-7 of the DEIS. Rather, the current agency policy is to only require such approval if a spill actually occurs.

S-2 These changes have been made in the FEIS.

S-3 Noranda has been in close contact with the Office of Water and Hazardous Waste, Waste Management Branch, U.S. Environmental Protection Agency, Region X, and the Idaho Department of Health and Welfare, Division of Environment regarding the recently promulgated Hazardous Waste and Consolidated Waste Permit Regulations. This has included filing of the initial Notification of Hazardous Waste Activity and the Application for a Hazardous Waste Permit, Consolidated Permits Program. The company is aware that while recent amendments to the Resource Conservation and Recovery Act Hazardous Waste Regulations (specifically 40 CFR Part 261) temporarily excluded from regulation the solid waste resulting from exploration, mining, smelting and refining of ores and minerals, the exclusion does not apply to such wastes as spent solvents and discarded chemical products which may be produced at the facilities. A review of the lists of hazardous wastes identified in the Hazardous Waste Regulations indicates that Noranda will not be generating any of these wastes. If at a later time it is determined that any of the wastes listed will be generated, the company will prepare a Hazardous Waste Management Plan in conformance with the Subtitle C Regulations. The Plan will be submitted to EPA for review and approval. The Plan will also be incorporated into the final Operating Plan on file with the Salmon National Forest.

S-4 Please see response 0-10.

Mining Plan Approval

5 As we understand the Forest Service's process, Noranda must have an approved mining plan before it can construct the proposed tailings pond on Forest Service land. When the plan is approved and the pond constructed, Noranda can then patent (take title to) the tailings pond site and this site will then no longer be subject to the provisions of the approved mining plan, but will be subject to the provisions of the State of Idaho approved mining plan (a separate but not necessarily different document).

At a minimum we would recommend that the Forest Service work with the State to insure that the two mining plans are compatible. Additionally, we recommend that the Forest Service consider, in the FEIS, the potential for placing restrictive covenants on the title that would be granted to this land. Such covenants could be designed to insure compliance with the Forest Service approved mining plan and appropriate "custodial" treatment of the tailings pond to insure its structural integrity after the project is terminated.

Mitigation/Reclamation Plan

6 We believe that the mitigation measures, monitoring plan, and conceptual reclamation plan discussed in the DEIS will all make signficant contributions to minimizing the environmental impacts of the project. We therefore recommend that the record of decision require their implementation. We also suggest that as specific reclamation measures are developed, the Forest Service arrange for their review by other resources agencies and agencies with expertise in mining. Such a review process could result in improved rehabilitation of the mine site and its environs without significant additional costs to Noranda.

7 Finally, we note from the DEIS that not all of the environmental problems resulting from past mining at the Blackbird site will be corrected as a result of the new work by Noranda. We believe that it would be appropriate for the FEIS to consider the possibility of the Forest Service using either a portion of the royalties that will result from the Noranda operation or appropriated funds to complete the restoration of the Blackbird site.

Based upon this review we have rated this DEIS ER-2 (ER: environmental reservations, 2: insufficient information). It should be noted that the insufficient information portion of the rating relates only to the air quality and water quality questions outlined above and in the enclosure. It should also be noted that our environmental reservations relate solely to the question of whether the proposed mining plan and associated Forest Service plans will minimize the adverse environmental consequences of the project and maximize the environmental restoration associated with it. We believe that the proposed plan will be environmentally beneficial and we concur with the Inter-disciplinary Team's judgement that Alternative 1

S-5 The Forest Service will work with the Idaho Department of Water Resources to coordinate construction, operation, and abandonment requirements. Other than reserving easements or right-of-way, the federal government cannot place restrictive covenants on patents issued.

S-6 The Forest Service will follow the coordination procedures described in the EIS (page 4-40) in reviewing subsequent reclamation plans.

S-7 There are no royalties from mining locatable minerals on public lands, and the Forest Service cannot expend funds on private lands. For additional information please see Chapter 4 of the EIS.

is preferred from an environmental perspective. This rating and the date of our comments will be published in the Federal Register in accordance with our responsibility to inform the public of our views on proposed Federal actions pursuant to Section 309 of the Clean Air Act, as amended.

We appreciated the opportunity to review this DEIS and would be glad to discuss our concerns with you and your staff. You may contact either Daniel Steinborn, our Team Leader for Energy & EIS Review, at (FTS) 399-1266 or "Bub" Loiselle at (FTS) 399-1096 to arrange such discussions.

Sincerely,

Roger K. Mochnick for
Elizabeth Corbyn, Chief
Environmental Evaluation Branch

cc: Idaho Operations Office
Alexandra Smith
Robert Courson
Michael Johnston

U.S. Environmental Protection Agency
Region 10

Blackbird Cobalt-Copper Project
Detailed Water Quality Questions and Concerns

8 1. On page 3-37 of the DEIS there is a brief discussion of the discharges of treated surface runoff to natural drainages. The FEIS should examine these discharge sites to determine whether any of the discharges will reach surface waters. If any of these discharges will reach surface waters they will require NPDES permits under the Clean Water Act. Similarly, the FEIS should examine the effects which these discharges would have on surface water quality.

9 2. A development schedule should be included in the FEIS (page 4-7) that would show when the new tailings dam/disposal facility would be ready to receive the estimated 1,600 gallons per day of sludge for disposal. The FEIS also will need to examine the potential for surface water heavy metals contamination from this sludge disposal system. Specifically, since the groundwater systems in the area are unsuitable for use as a make up water source, it may be hypothesized that they have high percolation rates to surface water sources. If this is true, then sludge water infiltrate from the sludge disposal area could move through the groundwater system(s) to surface waters. This possibility should be addressed in the FEIS. Moreover, given this potential we believe that a groundwater monitoring program should be developed to provide for the early detection of this possible water quality degradation. An adequate program will probably require more than one observation well downgradient from the tailings dam (page 4-25).

10 3. We agree that sediment loadings will probably not be the primary water qualty problem associated with the project (page 5-8). However, we believe that additional sediment loadings should be minimized to the maximum extent practicable. Consequently, we recommend that the FEIS evaluate the possibility of constructing sediment retention facilities at waste disposal areas and quarry sites, along the main haul roads and the tailings dam perimeter road, and in the Meadow Creek Area. The FEIS should evaluate the technical feasibility of installing such facilities, their effectiveness at reducing sediment loads, and their costs.

S-8 If the reviewer is referring to structures mentioned on page 4-37 of the DEIS, they are currently, or will be permitted under a valid NPDES permit. In all cases, the discharges from those structures will reach surface waters, but the NPDES permitting process requires acceptable water quality levels for the discharges, so the effects on water quality will be minimal.

S-9 A development schedule will be included in the final Operating Plan that is submitted to the Forest Service for approval, as described on page 4-40 of the EIS. Please see response D-8 for clarification of the effects of sludge disposal. The proposed groundwater monitoring program is discussed in response D-9.

S-10 Please see responses D-14 and P-1.

11

4. We also concur with the view that the Blackbird Project represents an opportunity to improve water quality in Blackbird Creek, Panther Creek, and other drainages whose water quality has suffered and continues to suffer from the impacts of past mining activities. However, we believe that one of the key issues associated with this matter is what degree of improvement should be considered acceptable upon project abandonment. The DEIS notes, at page 5-12, that the predicted 40% reduction in metals loadings to Blackbird Creek is small, but it does not go on to evaluate possible means of further reducing metal loadings to Blackbird Creek or any of the other affected drainages. The FEIS should examine the array of additional restorative and mitigative measures which Noranda could be required to take, or that the Forest Service could implement on its own, and their potential benefits to water quality and aquatic habitat. A brief discussion of some of the possible measures is provided below.

A. The DEIS states, on page 4-6, that "mine water above the 6,850' level would continue to be diverted to the 6,850' level and transported through the mine by gravity in open channels to a concrete surge tank at the water treatment plant site." We cannot tell from this description whether the drainage from portals at the 7,117' and 7,265' levels (Bucktail Creek mine drainage) would be diverted to the 6,850' portal for treatment. We believe that such action is appropriate and merits specific consideration in the FEIS (See Blackbird Project Proposed Environmental Improvements; Noranda Mines, Limited; March 1979).

B. The DEIS indicates, on page 2-10, that another significant potential source of pollution for Bucktail Creek may be drainage through the Blacktail Pit. The FEIS should examine whether this is in fact a significant source of low quality recharge water and, if so, examine whether it would be possible to divert drainage around the Blacktail Pit as a water pollution abatement measure.

C. The DEIS notes, at page 5-13, that the water treatment plant discharge has little buffering capacity and therefore will not alter the pH of Blackbird Creek enough to cause the precipitation of metals which are being introduced through Meadow Creek. The FEIS should examine the possibility of modifying the treatment plant's process so that the buffering capacity of the effluent is increased. If it were possible to increase the buffering capacity to the point that the pH in Blackbird Creek were elevated from a range of 6-7 to a range of 7-8, figure 2-3 indicates that significant precipitation of metals would occur. This resulting pH is still within the band which is suitable for all relevant forms of aquatic life. (The text in this section should be corrected so that it references figure 2-3 rather than table 2-5).

As noted previously, we believe that in cases where it would be inappropriate for Noranda to carry out the water pollution abatement work suggested above, the Forest Service should consider carrying out the work itself using either a portion of the royalties from the project or appropriated funds.

S-11

In addition to the responses below, please see response 1-1.

A. Diverting drainage from the Bucktail Creek drainage was discussed by the EPA, Idaho Department of Health and Welfare, and the Forest Service (the portals are on private ground). It is the Forest Service's understanding that these discussions led to the requirement in the NPDES permit; "In the event that unanticipated mine drainage results from development of any new or existing mine portal, such drainage shall be subjected to appropriate treatment . . . "

B. This is a technically infeasible option as most of the drainage from this feature comes from precipitation on the pit area itself. (This feature is on private land.)

C. This measure has been examined to some degree. Although there could be some secondary precipitation, the material would be deposited in the streambed for some distance and flushed out during high flows. In addition, there are indications that the chemical nature of the sludge itself would be less stable. There is no reason to rule out changing the process if it will result in a real benefit to water quality. Noranda has indicated it is willing to undertake such a change as long as it is technically and economically feasible and in accordance with the NPDES permit.

The reference has been corrected in the FEIS.

LETTER T

November 8, 1981

Mr. Tom Buchta
Project Coordinator
Cobalt Ranger District
Salmon National Forest
Box 729
Salmon, Idaho 83467

Dear Mr. Buchta:

I have read the Draft Envioronmental Impact Statement of the Blackbird Cobalt-Copper Project and submit this statement as my personal opinion.

1 My principal concern would be with the long-range effects on the water quality of Blackbird and Panther Creeks, and the project impact on the City of Salmon. The DEIS indicates that Alternative 1 will provide some improvement in water quality for Blackbird and Panther Creeks during the life of the project, with greater improvement after abandonment, and that Alternatives 1, 2, and 3 will have about the same economic impacton the City of Salmon. I agree with the Forest Service that Alternative 1 is the best decision for this project.

As a member of the Salmon Planning and Zoning Commission, my concern is with the Scio-Economic effects of this project on the City of Salmon. Hopefully the Salmon Planning and Zoning Commission will be able to submit Commission comments before November 13.

Sincerely youre,

Glenn E Ford

Glenn E. Ford
Box 181
Salmon, Idaho 83467

NOV 12 '81

RESPONSE TO LETTER T

T-1 The Forest Service will consider your comments when going through the decision-making process.

LETTER U

DEPARTMENT OF THE ARMY
WALLA WALLA DISTRICT, CORPS OF ENGINEERS
BUILDING 602, CITY-COUNTY AIRPORT
WALLA WALLA, WASHINGTON 99362

REPLY TO
ATTENTION OF:

NPWEN-PL

12 November 1981

Mr. Richard T. Hauff
Forest Supervisor
Salmon National Forest
Forest Service
P. O. Box 729
Salmon, Idaho 83467

Dear Mr. Hauff:

We have reviewed the Draft Environmental Impact Statement (DEIS) for the Blackbird Cobalt-Copper Project, Lemhi County, Idaho. Our review indicates that the project should not conflict with Corps jurisdictional responsibilities of navigation, flood control, hydropower development, or projects planned or constructed by the Corps. We do not foresee any significant effects on flood discharges as a result of the project.

1 Any fills in creeks where average annual flows exceed five cubic feet per second will require a Corps of Engineers' Section 404 permit. This requirement should be stated in Section 1.5 of the DEIS. A permit for diversions in Panther Creek has previously been issued to Noranda and we have had discussions with Noranda personnel concerning additional permit requirements.

The opportunity to review and comment on the DEIS is appreciated.

Sincerely,

M G Brammer
M. G. BRAMMER, P.E.
Chief, Engineering Division

CC to D-1 11/19 KZ

RESPONSE TO LETTER U

U-1 The FEIS has been changed accordingly.

LETTER V

William J. Cannon
Mayor

Harold F. Neyman
Clerk

Bill Allen
Treasurer

1950
2810
Noranda
Blackbird

CITY OF SALMON

Office of the Clerk
P. O. Box 770
Phone 756-3214
SALMON, IDAHO - 83467

November 25, 1981

2 cc sent
D-1
RTH 11/25/81

Mr. Richard T. Hauff
Supervisor
Salmon National Forest
P. O. Box 729
Salmon, Idaho 83467

Re: Draft Environmental Impact Statement and the Supporting Socio-economics Technical Report for the Blackbird Project

Dear Mr. Hauff:

The Salmon Planning and Zoning Commission at its regular meeting on November 10, 1981, reviewed and discussed the Environmental Impact Statement for the Blackbird Project with primary consideration being directed to the "Socio-economics Technical Report." For the record, the Commission passed a motion that the Salmon Planning and Zoning Commission comment to the Draft Environmental Impact Statement (DEIS) regarding its concerns with respect to the following topics:

1. Schools
2. Housing
3. Water Supply and Wastewater Treatment
4. Law Enforcement and Traffic Control

1. Schools

1 While the Socio-economics Technical Report clearly admits Salmon, "...schools may experience capacity problems," and "...is projected to experience the largest impact from the project..." the report does not consider ways Noranda can help cope with these problems.

Our schools are as near to capacity as is comfortable at this time, without detracting from the present educational quality. The DEIS, however, leaves the impression that School District 291 has unused capacity for 45 to 50 students, when in reality, three of the four buildings could accommodate under crowded circumstances 45 to 50 students each for a total of about 150 additional students.

RESPONSE TO LETTER V

V-1 The analysis of school capacities presented in the DEIS was based on information received from former School Superintendent Cook in 1981. This analysis indicates that additional classrooms and teachers will be needed by 1986. The figures present in the DEIS on tax revenues generated by the project at full production levels (assumed to be 1986) support an opinion that the needed improvements could be financed by these revenues. The FEIS develops that conclusion in more detail following discussions with the current school superintendent. (see socioeconomic summary, Table 5-4). The reviewer is correct in noting, as is stated in the Socioeconomic Technical Report, that under crowded conditions the school district has additional capacity for about 145 students.

2. Housing

2 The socio-economics impacts section projects a housing deficit of 227 units and states that "...the issue will be (the) affordability of housing, not the ability of the local housing sector to produce enough units." The Planning and Zoning Commission agree, but believe that an important and critical issue has not been addressed, i.e., the availability of suitable locations for mobile home parks, subdivisions, apartment complexes, and single housing units. The Salmon Planning and Zoning Commission recognizes that we have a specific responsibility in this area, but that to the best of our understanding, there are very significant limiting factors, namely, soils, ground water and flood plain problems, that limit the availability of suitable development locations. The Salmon Growth Management Plan is an incomplete document because it fails to address these issues and identify areas within or outside of the city that are particularly suited for housing development. The DEIS fails to take into account both the existing environment in and around Salmon and the inadequacies of the planning documents the Salmon Planning and Zoning has to work with at the present time.

We would like to suggest that Noranda Mining, Inc. consider providing technical expertise to the City of Salmon evaluating the environment (particularly soils and hydrology) in the Salmon area to identify the best locations suitable for housing development.

3. Water Supply and Wastewater Treatment

The DEIS recognizes the present capacity and limitations faced by the City of Salmon in terms of water supply, and states that the capacity of the system will not be adequate to meet the projected need of 3.1 mgd for 1986; it suggests that in order to meet future demand, the system be studied and some leaky pipes be replaced. These are not very helpful suggestions. With 227 new housing units anticipated, (to the existing 1980 census count of 1430 units) the Planning and Zoning first believes that the project related impact on the water supply is underestimated and that the actual impact may be several times greater than that described in the DEIS.

3 Providing for project related increases in the water supply is the issue that needs to be addressed in the DEIS. This issue is integrally related to the location of new housing units and their relation to the existing system. We believe that it would be beneficial for Noranda to provide the city with technical expertise in evaluating the soils and hydrology of the Salmon area and help the city identify the economically viable on the ground alternatives for water supply development. We are particularly concerned with the existing problem.

Housing location, system requirements, engineering design, construction, and performance are also a major concern. Soil and hydrology considerations are significant limiting factors that the City of Salmon has not had the opportunity to adequately evaluate.

V-2 The Soil Conservation Service (SCS) is a good source for this kind of information. The SCS has an ongoing soil survey program which ordinarily places a high priority on mapping the soils on private-agricultural land. It is our understanding that because of contractual obligations this is not the case in Lemhi County. We suggest that city and county officials contact the local SCS office as a first step in obtaining the needed survey for the Growth Management Plan. Noranda may, as you suggest, play a role in accomplishing this program, but we believe it is most reasonable to use the expertise available from the SCS, if at all possible.

V-3 The water supply system capacity and current use were understated in the DEIS by nearly a factor of two. This information was provided by the Salmon City Clerk and has been revised in the FEIS (Table 5-4). The corrected figures show adequate water treatment pumping and storage capacity for baseline and project-related growth. The delivery system is in need of upgrading and, as you have noted, it is important to locate new housing where it can be most economically served by the system. Our figures for water use are based on a planning standard of 150 gallons per day per person (we used the entire 1,038 persons allocated to the Salmon area and rounded up to 200,000). This standard includes average residential, commercial, and associated industrial water useage; strictly residential only water use is commonly 100 gallons per person per day.

Given the limitations of the environment around Salmon and the present state of our knowledge concerning these factors, we feel that Noranda should be willing to provide the city with technical expertise on identifying economically practicable alternatives, and technical solutions.

4 The DEIS states very simply that the City of Salmon will bear the cost of providing adequate waste water treatment in the future. Given the project related 227 unit increase, we feel this is unreasonable to impact the city with the new services it will be asked to provide.

4. Law Enforcement and Traffic Control

5 The City of Salmon will require additional police officers and alternative protection measures to handle the increases in population that will result from the Noranda Project. This is not stated in the DEIS.

In addition, the increases in traffic, parking, and other traffic related problems that will occur on Main Street, and along adjacent side streets, are not addressed in the DEIS; e.g., what is the project related increase in the number of automobiles in Salmon? This is a very critical question which needs to be addressed comprehensively. Congestions on the Highway 93 bridge, and emergency response during peak traffic hours are two of several possible conflicts identified.

In our opinion, the Draft Environmental Impact Statement and supporting Socio-economics Technical Report have not met the purpose of the National Environmental Protection Act requirements; because, City decision makers will have no clear direction as to how to plan for the future impacts of the Noranda Project on the City of Salmon.

Sincerely,

William A. Oldham

William A. Oldham
Chairman
City of Salmon
Planning and Zoning Commission

WAO/mel

cc: Jim Smith
City Clerk
City of Salmon

Brent Bailey
Noranda Mining, Inc.

V-4 At a recent public meeting the city's consulting engineer working on a facilities plan for upgrading the sewer systems said the additional project-related increment would not be a significant factor in project design. In the FEIS we have suggested several mitigation options available to the City of Salmon.

V-5 The DEIS cited a need for additional law enforcement officers in city and county jurisdictions. The FEIS further describes the impact on law enforcement and projects a need for two new project-related officers in the area as well as describing mitigation options to minimize the fiscal impact of these changes.

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